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No. 1

WASHINGTON AS A WORK OF CIVIC ART To Be the "City Beautiful"—Work of Senator McMillan—New Buildings Proposed—The Plan Outlined—Will Cost Millions'

By Charles Moore

THE exhibition of the photographs, drawings, and models illustrating the plans of the report on the improvement of the park system of the District of Columbia, held at the Corcoran Gallery of Art in Washington, during January and February, represented a well-considered, comprehensive, and highly intelligent attempt to deal with a national capital as a work of civic art.

So L'Enfant had dealt with the original problem, a century and a decade ago; and his plan appealed to Washington and Jefferson.

The L'Enfant plan, although frequently misunderstood and often invaded, never had ceased to be cherished as the one thing which has caused the pre-eminence of Washington among American cities, in respect to beauty and dignity. Consequently, when the Senate Park Commission immediately and unreservedly recognized the virtues of the original plan of Washington, they at once created a confidence in their ability to deal in a large way with the problem submitted to them.



MODEL OF WASHINGTON, SHOWING PRESENT CONDITION

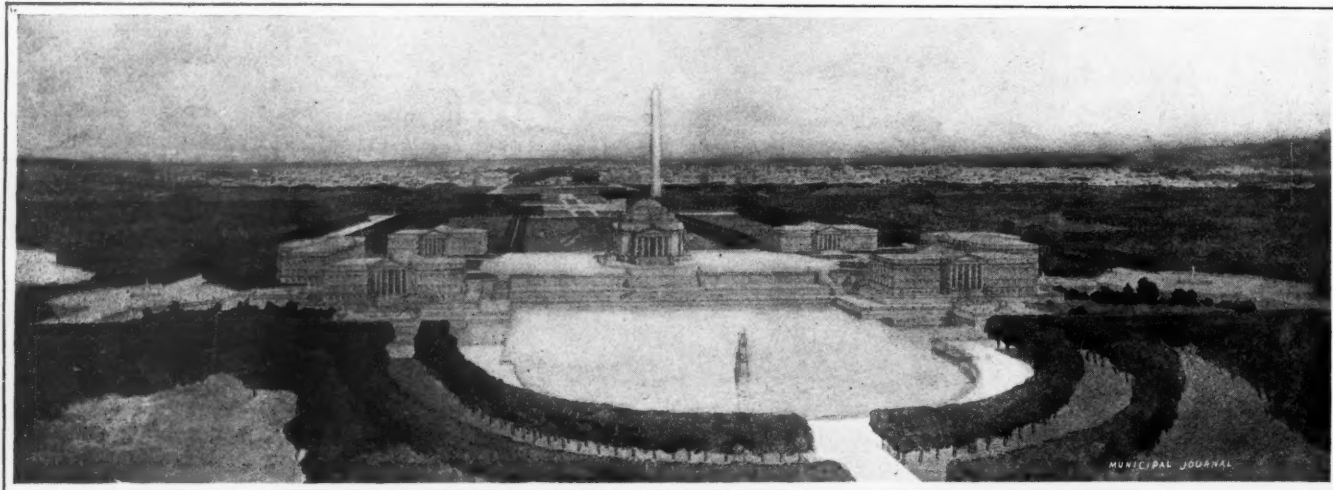
To Washington, doubtless, because he was familiar with axial relations and with reciprocity of sight between public buildings, as exemplified in the capital city of his native State, Williamsburg; to Jefferson for like reasons, and also because he had visited the great cities of the old world, and had preserved in his own library "maps drawn on a large and accurate scale" of those which were unusual either for situation or for plan.

(1) The models, drawings and photographs are now on exhibition in the Library of Congress.

The Commission had its origin in Senator McMillan's intimate knowledge of the possibilities of the District of Columbia and his keen desire to see Washington the most beautiful of Capital cities. He realized from the first that the highest possibilities in the way of a plan were to be realized only by selecting the most experienced and the most successful professional men, and in preventing strictly any lay interference. Consulting with the committee of the American Institute of Architects, he readily acquiesced in their selection of Daniel H. Burnham and Frederick Law Olmsted, Jr., and in their

further selection of Charles F. McKim and Augustus Saint Gaudens, being satisfied that any recommendations coming from such a source would command the respect of the country. Then having outlined to them the problem as he saw it, he left them, unhampered by any suggestions of temporary expediency, to work out an ideal plan.

Moreover, between the Potomac and the range of hills a mile or more away to the north, the city of Washington was planned to accommodate 800,000 people—at that date the size of London—after the then fashion of housing people in cities; and it is only within the past two decades that the city proper has overleaped these boundaries.



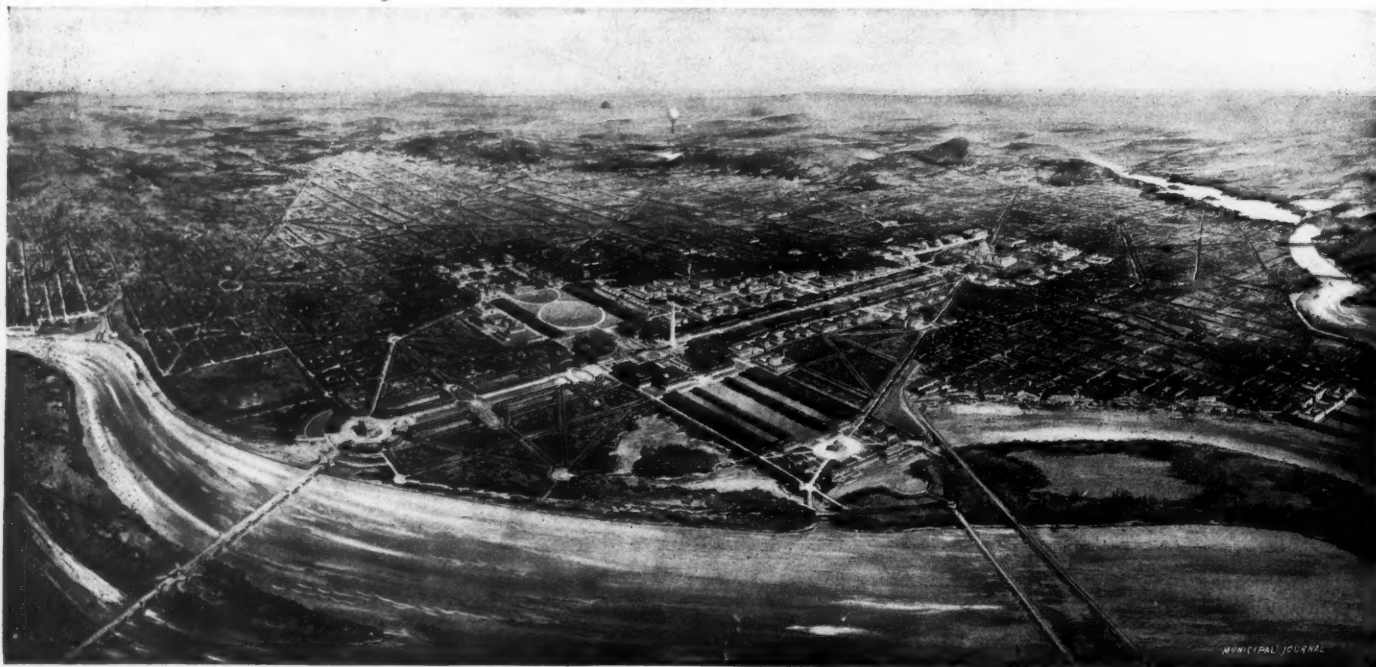
MEMORIAL SITE ON THE POTOMAC—AXIS OF WHITE HOUSE

Giving them the support of his large influence in Congress, gained by a service of thirteen busy years on the Senate Committee on the District of Columbia, he also guaranteed the considerable expenses necessary for the presentation of the plans in so elaborate a manner that there need be no uncertainty in the execution of them.

Washington and Jefferson and L'Enfant located the Capitol, the White House and other important buildings in orderly relations one to the other; and the diagonal avenues were laid out so as to give expeditious access between them. Had Washington developed as rapidly and magnificently as they expected, there would have been

When the expansion began, however, it became necessary to provide for the more exacting population of these days large parks and recreation grounds; while at the same time the health of the city made imperative the reclamation of the Potomac flats, by which work the engineers have added to the L'Enfant composition a mile of territory.

To deal with this new composition as a unit; to re-establish relations between the Capitol, the Washington monument (which L'Enfant located) and the White House; and to provide for suitable connections between the outlying parks—such in part was the task laid



BIRDSYEF VIEW OF THE PROPOSED TREATMENT OF WASHINGTON

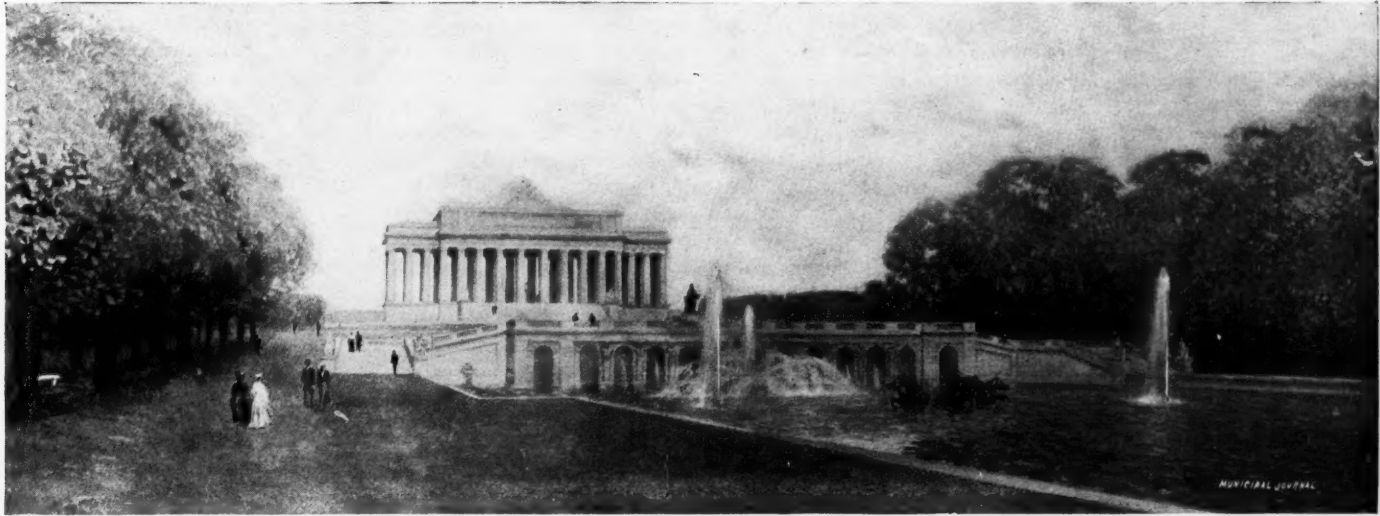
small opportunity for mutilating their plan. Unfortunately, however, poverty compelled their prospective gardens to become cow-pastures which in time even a railroad improved; while their canals played the part of open sewers which of necessity came to be arched over.

upon the Park Commission. The other portion of their work came to them as a consequence of the first part. Washington being a capital city in which landscape was used to enhance the value of public buildings, those officials who had building problems to solve laid their cases before the Commission and sought their aid and advice.

Thus naturally it came about that the Commission were called upon to deal with a larger and more comprehensive problem than has ever before been presented to a body of civic improvement experts.

How well they have succeeded time alone can tell; and it is as

For the improvement of Potomac Park in which this memorial is to stand Congress has appropriated \$70,000. For the Memorial Bridge, which is to connect the Lincoln memorial with the National Cemetery at Arlington, the Senate has proposed an initial appropri-



THE LINCOLN MEMORIAL

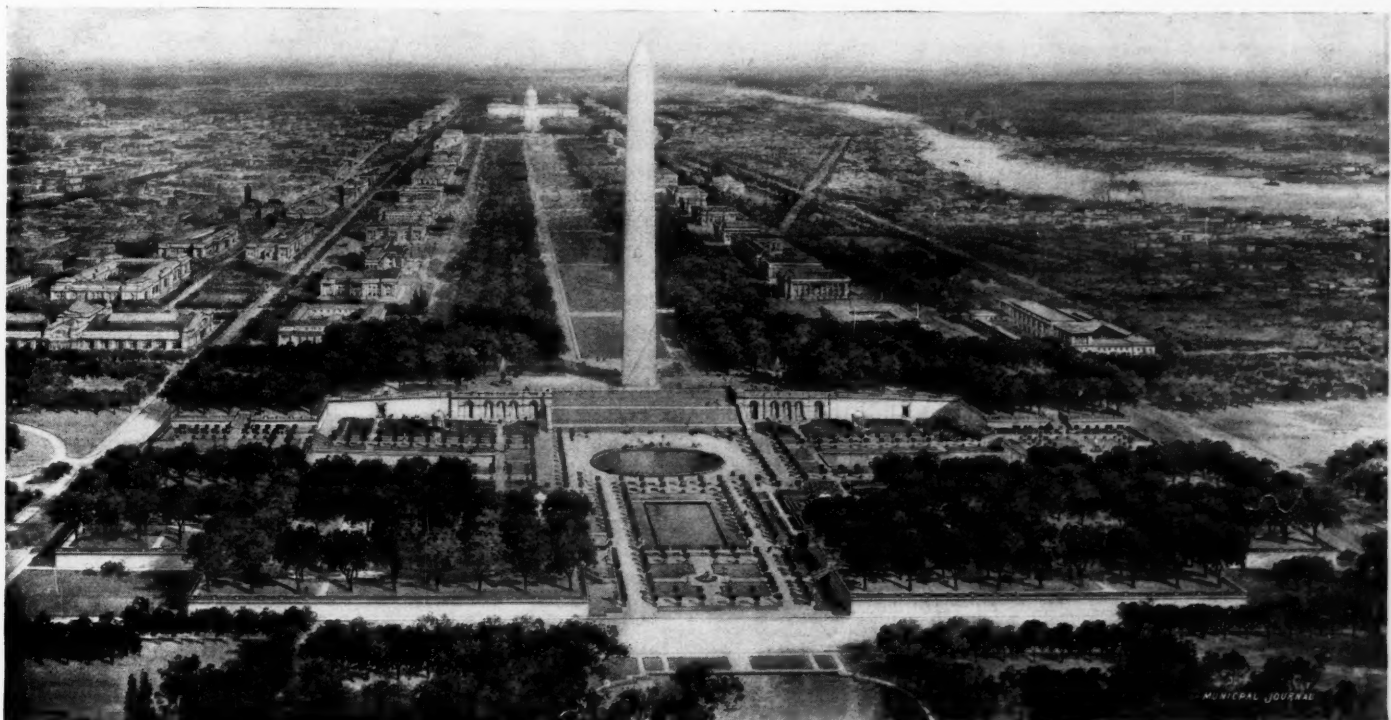
yet too early to express definite opinion on the subject. This much may be said, however: Congress in its own way has taken up portions of the work with an earnest desire to work out the new plans. For example, the bill for a new union station for the seven railroads now entering Washington has passed the Senate and is pending (June 7) in the House. A union station means the removal of railroad tracks from the Mall, thus restoring to its intended uses the great stretch of park between the Capitol and the White House.

On the axis of the Capitol and the Monument, a mile west of the latter, on the banks of the Potomac, the Commission located the Lincoln memorial, and recommended as the type of structure a Doric portico, approached by a canal 3,200 feet in length and 200 feet broad. The Senate has passed the bill to create a commission to erect this memorial, and the bill has been reported to the House.

ation of \$100,000; and it is expected that the House will agree to this item so that the corner stone of the bridge can be laid at the time of the encampment of the Grand Army of the Republic, in October.

Flanking the Mall on the north and the south between the Capitol and Monument, the Commission has proposed that public buildings devoted to the scientific purposes of the government shall be erected. Under the supervision of the Commission plans have been prepared and accepted for a building for the Department of Agriculture; and the Senate has provided for the preparation of plans for a new building for the National Museum. Each of these buildings will cost upwards of \$2,000,000.

Ranged about the Capitol grounds the Commission has proposed a series of buildings bearing a common relation to legislative work; and it is certain that on one of these squares at an early day, an



THE MALL SYSTEM LOOKING EAST FROM THE MONUMENT.

office building for the use of the members of the House of Representatives, at a cost of \$4,000,000, will be erected. Nor will the Senate be long behind the House in making like provisions for its members. The Supreme Court building will be longer in coming; but already its shadow covers the square just north of the Library of Congress.

Directly in front of the Capitol grounds on the west, the Commission would open a great square having as its chief adornment the statues of Grant and his great lieutenants, Sherman and Sheridan. The recent competition for the Grant statue resulted in a provisional award, with the requirement that a restudy should be made in view of the proposed location.

Called upon by the President to advise as to the problem of a more convenient arrangement of the White House, the Commission recommended, first, a temporary building to contain the President's offices, thus restoring the White House to its original uses as a residence; and, secondly, certain changes in the interior of the house itself to fit it for the larger social functions without destroying

of the work is municipal; the second is national. To begin the national portion Congress has appropriated \$150,000, which will be available after July 1 of this year. Then where the Anacostia unites with the Potomac, the Secretary of War proposes to build a War College and Engineers' School of Instruction according to plans prepared by one of the members of the Commission; and for this purpose something over \$1,000,000 will be available during the coming fiscal year. When completed, this treatment will provide a dignified water approach to Washington, just as the monumental union station (designed by another member of the Commission) will furnish the gateway to the national capital.

That squalid portion of the city lying between Pennsylvania avenue and the Mall was set apart by the Commission for buildings devoted to municipal uses and like purposes. Congress has provided for a new municipal building, or city hall, to be erected on a site other than the one named by the Commission, but still in general harmony with the scheme. Again, the Daughters of the American Revolution have purchased as a site for their Continental



THE MALL SYSTEM LOOKING FROM THE CAPITOL

the integrity of a building dear alike to the hearts of the people and to the intelligence of the body of architects. Before this article shall reach its readers, workmen will be laboring to put into execution these suggestions; and when Congress reassembles in December the official force of the Executive will have become accustomed to their new quarters and the family of the President will be settled in more commodious and convenient apartments; while the restored White House will afford to the larger social functions of the coming winter the opportunities for dignified entertainment.

The commission proposed that the square bounded on the south by the White House, the Treasury and the State, War, and Navy buildings, be completed by the erection, on the west, of a building for the use of the Departments of State and Justice; and on the other two sides by such departmental buildings as may be needed in the future, thus creating an executive group to supplement the proposed legislative group on Capitol Hill. Certain local interests have thus far interfered with this portion of the plan; but the barrier can be only temporary.

Along the Anacostia it is proposed to create a water park on the upper stretches, and a commercial frontage below. The first portion

Hall a square facing the White Lot, within the space recommended by the Commission for structures of a semi-public character.

It would be far from the truth to claim that all of these plans had their origin with the Park Commission. What can be said, however, is that the Commission has made a study of the various problems presented in the District of Columbia, and has given advice as to each one. In some cases this advice coincided with public opinion; in some it crystallized public opinion; in others it overthrew established convictions; and in all other cases it proposed entirely new solutions.

The results thus far reached have been achieved largely by the disposition shown by the Commission to work in sympathy with those officials who are charged with the administration of the District of Columbia, and legion is their name; and also by the equally laudable disposition shown by these same officials to call the Commission into council and to take the advice so freely bestowed. In a hundred places and ways the ideas presented in the report have quickened and stimulated both officials and citizens. The question no longer is to what shall be done, but how soon can the magnificent plan be carried out.

Everywhere there is to be noted new ideals and new determination to achieve these ideals. Civic pride and emulation among cities have been the mainsprings in the great art revivals of the past. With our wealth and ambition may we not look forward to the cultivation and exemplification of good taste and all other enduring qualities in the monumental building and planting of the future.

Other cities have felt the new impulse. The pictures of the proposed improvements in Washington have been presented by the stereoptican in many of the large cities of this country, and the meaning of them has been explained by some member of the Commission or by a local architect who has made a study of the subject.



THE PALISADES OF THE POTOMAC

THE SANITARY DISPOSAL OF SEWAGE

The Danger of Polluted Rivers—How to Purify the Sewage—An English Method Introduced—Its Successful Operation Described

By H. D. Wyllie

THE pollution of rivers and streams by the discharge into them of town sewage and manufacturing wastes is fast becoming a matter of national importance as affecting the health of communities along their banks. When the country was sparsely settled and sewerage systems were the exceptions rather than the rule, our streams were comparatively pure, but by degrees the primitive methods of our forefathers have been discarded and large sums of money are being spent annually in the construction of sewers, with the result that our rivers and streams are becoming polluted, spreading disease to an alarming extent.

Surgeon-General Wyman of the Marine Hospital Service, in a letter to the Senate committee on public health some years ago, stated that 45,000 deaths a year in the United States were due to typhoid fever, and urged the importance of investigating the pollution of water courses and other sources of water supply.

Various methods of sewage purification have been introduced from time to time, but sewage farms, chemical precipitation, intermittent filtration and others have each in their turn been discarded on account either of inefficiency or the prohibitory cost of construction and maintenance.

AN EFFECTIVE REMEDY

Within the last few years, however, the septic tank system, introduced by Mr. Donald Cameron, of Exeter, England, has rapidly grown in favor both in Europe and this country, and bids fair to completely replace the older methods. Nearly two hundred of these plants have been installed in Great Britain during the last two or three years and within the past year the septic tank syndicate has installed several plants on this side of the Atlantic. The first complete system installed here was at Sackville, New Brunswick, for the Mount Allison University. This plant was put in a year ago last October. The stream into which the University sewage is discharged is used for dairy purposes a short distance below the sewage outlet, and it became necessary to provide means for its complete purification on that account. A septic tank and filter beds were designed, and the filtrate discharged through weeping drains. When this system had been in operation six months Dr. Allison, the Pres-

ident of the College, advised the writer that the system had operated successfully through the winter and was at that time giving the most complete satisfaction. He stated, however, that the effluent had not quite reached the 92 per cent. of purification claimed for the system, but was rapidly approaching it.

A few months after the Mt. Allison plant was installed, three similar systems were installed at Vancouver, B. C. The sewage of Vancouver is discharged into tide water, so that complete purification is unnecessary, the tank effluent being discharged directly from the septic tanks without filtration. So many inquiries have been made as to the operation of the system in Vancouver that the City Engineer has not had time to reply to them and has published a pamphlet on the subject, from which the following extract is taken:

THE SYSTEM ESTABLISHED IN VANCOUVER

"The Vancouver septic tanks are three in number, designed for populations of 5,000, 3,000 and 2,000 respectively, and were constructed in 1900 from plants furnished by the Septic Tank Syndicate; the first being put in operation about January 1, 1901, and the others a month or two later. The results so far are quite satisfactory, though the quantity of sewage passing through them is not such as to make the conditions most favorable for the development of bacterial action. In one of the tanks the scavengers have been dumping night soil to the extent of five or six loads a night, and, though the last tank to be put in operation, the effluent is the clearest. There have been no analyses made yet either of the sewage or the effluent, but the practical effect of the bacterial action is very apparent. There is no smell from the tanks or the effluent. The earth has been filled over the tanks, levelled and seeded, so that the appearance of the surface is not unsightly or offensive in any way."

Last fall the writer completed the construction of a system of sewage purification for Glencoe, Illinois, consisting of a septic tank and a double contact filtering system. Four high and four low level filters are used, and a recent chemical and bacterial analysis made of the crude sewage, tank effluent and filtrate shows a remarkable degree of purification.

CHEMICAL ANALYSIS

Source of Sample:	Free Ammonia.	Albuminoid Ammonia.	Oxygen consumed in 10 min. at 100° C.	Percentage of Purification.
Crude Sewage	4.660	3.900	22.60	....
Tank Effluent	1.700	.180	2.64	88.3
Filtrate .....	.202	.025	.32	98.58

BACTERIOLOGICAL ANALYSIS

	Bacteria per C. C.	Percentage of Purification.
Crude Sewage.....	11,400,000	....
Tank Effluent.....	3,300,000	71.
Filtrate	100,000	99.12

At Glencoe the main outfall sewer discharges into a grit chamber, for the purpose of intercepting mineral detritus, etc. From this chamber two channels lead off to a tank, into which the sewage is delivered by two specially designed inlet pipes discharging below the water level.

THE PLANT AT GLENCOE

The septic tank is 56 feet long, 10 feet wide, about 7 feet deep and is covered with a concrete arch. Access to the tank is provided for by means of two manholes, which are never opened except for purposes of inspection. In the tank the solids present in the sewage are separated and retained and the organic matter is acted upon by the liquefying micro-organisms present, by which it is broken down into simple substances. The effluent thus freed from solids in suspension, passes off through a slotted cast iron pipe laid horizontally across the end of the tank, below the water level, into an effluent-collecting chamber.

Any mineral detritus which may escape from the grit chamber, together with the insoluble residue from the sewage solids accumulates slowly in the tank; it is not anticipated, however, that the deposit will need removal, except at very long intervals. In order that this may be done when necessary without draining off the liquid contents of the tank, a slotted pipe is constructed across the end at the bottom of the tank, leading off to a cleansing well; by opening a valve in the latter the deposit from the bottom of the tank may be drawn off. The Exeter plant has been in operation continuously for nearly seven years without such an accumulation of deposit as to require removal.

The effluent passes from the effluent chamber, down a succession of vertical shafts, to the foot of the bluff, where it is delivered automatically on to bacterial filter beds. There are four high-level filters, each 18 feet by 14, and four low-level filters of similar dimensions. They are all filled to a depth of four feet with furnace

clinker, crushed and screened to suitable dimensions. The tank effluent is distributed over each filter in turn, through channels laid on the top of the filtering material, the filtered effluent being collected by lines of agricultural drain tile laid on the filter floor.

The high-level filters are filled in order, each in turn being kept full while the next is filling, and the effluent discharged from each upper filter goes into the lower filter immediately adjoining it, the automatic gearing being so arranged that the whole works together. The effluent remains in each filter for a period of from four to five hours, during which the impurities present in solution are removed by the bacteria attached to the surfaces of the filtering medium. At the end of that time a discharge valve is opened and the filtered effluent escapes, drawing down after it a supply of air into every crevice of the filter, aerating it while the remaining filters are filling. This method of work renders the filters self-cleansing, so that they retain their purifying power indefinitely.

ADAPTED TO OUR CLIMATE

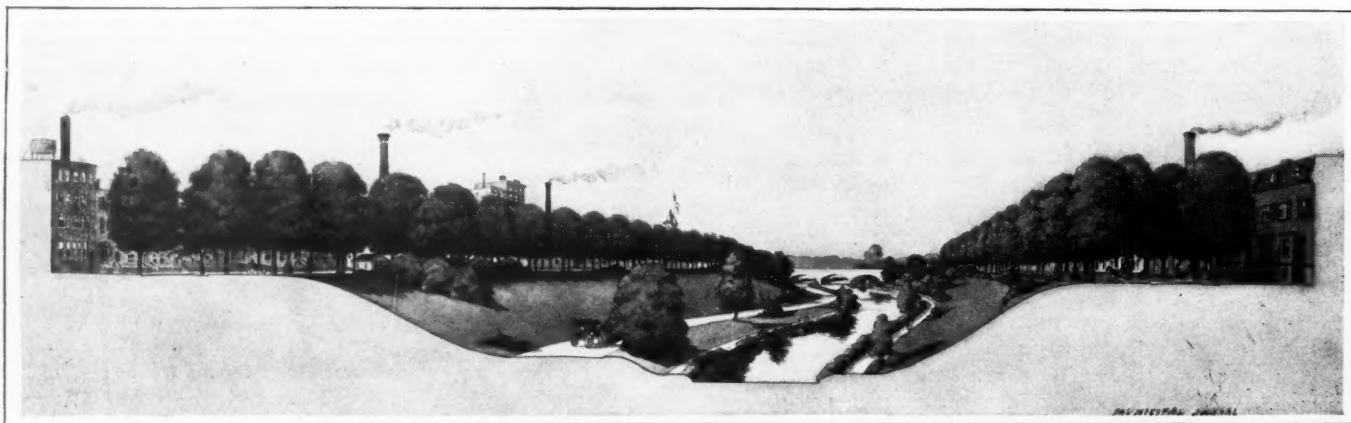
Considerable speculation has been indulged in as to the operation of this system in our climate, and I have watched the effect of extreme cold weather on the Glencoe plant with a good deal of interest.

During the coldest weather we have had this winter, from zero to 15° and 18° below, and lasting a week or ten days, the sewage left the septic tank at a temperature of about 55°, it lost on an average 15° in the two sets of filters, its passage through them occupying about 8 or 10 hours, and was discharged into the lake at a temperature of about 40°.

The upper filters at Glencoe are filled in the following order:—1, 3, 2, 4; No 1 remaining full while No. 3 is filling. When No. 3 is full the flow is diverted to No. 2 and the contents of upper No. 1 is discharged into lower No. 1. When upper No. 2 is full the flow is diverted into No. 4; the contents of upper No. 3 is discharged into lower No. 3, and lower No. 1 is discharged into the lake, and so on.

These operations are controlled by an automatic alternating gear and require no attention beyond an occasional oiling. With the present flow of sewage it takes from four to five hours to fill each filter, so that a complete revolution is made once in every 16 to 20 hours. During extremely cold weather ice forms on the top of the full filter, sometimes ½ inch thick, but breaks up of its own weight when the filter is discharged. While standing empty, the surface of the filtering material freezes to a depth of some inches, but when next filled thaws out immediately the warm sewage reaches it.

From my observations at Glencoe I am satisfied that even a double contact system can be operated successfully regardless of temperature, provided the alternating gear is properly protected. At Glencoe it is enclosed in two small brick buildings and boxed in, the warm sewage passing through rendering artificial heat unnecessary.



PROPOSED TREATMENT OF THE VALLEY OF ROCK CREEK. (SEE ARTICLE ON WASHINGTON AS A WORK OF CIVIC ART)

PUBLIC OWNERSHIP IN A CALIFORNIA CITY

Power to Produce Light and Water Obtained from Hill Streams—How the Water Is Collected and Converted into Power—So Successful Plant Must Be Enlarged

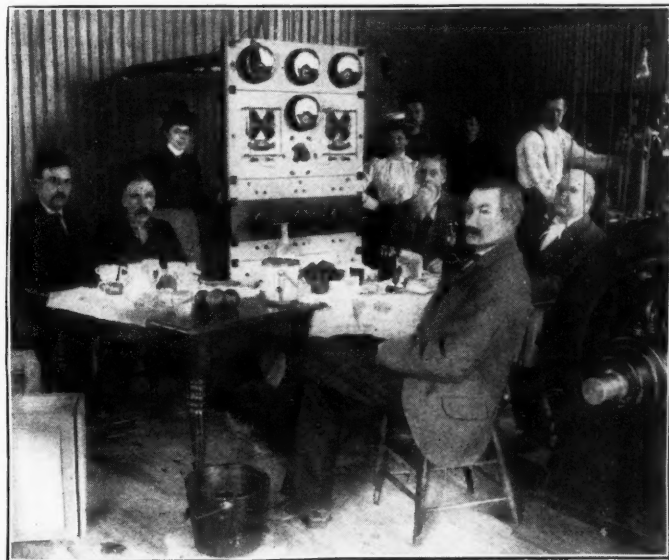
*By W. W. Barnes**

TWELVE miles back from the city, on Black Mountain, at an elevation of about two thousand feet, is found the power which lights and supplies with water the thrifty city of Healdsburg, California. The power was not as easily found in this locality as it may be found elsewhere, as water is at a premium on the Pacific Slope. The citizens wanted pure water, and they wanted light, and they

sible to retain the water in small catch basins, and the inaccessibility of most of the creeks made concrete work impossible. The water from these seven brooks is conveyed through two miles of four, five and seven-inch riveted steel pipe, with a fall varying from twenty to one hundred and eighty feet to the mile, to a point where the various pipes converge and flow into a ten-inch Matheson lock joint pipe. This pipe winds around the mountain side through the cross ravines, and is supported at the crossings by one-inch galvanized steel cables and red wood trestles.

HOW THE WATER IS COLLECTED

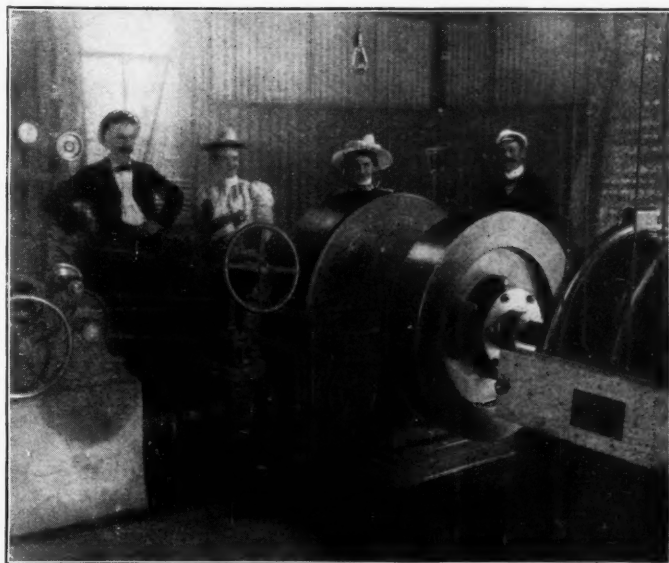
The storage reservoir, which has a capacity of about 800,000 gallons, was excavated out of almost solid rock. From this point a splendid view may be had of the beautiful Alexander Valley, which lies over 1,000 feet below, and through which the Russian river may be seen like a thread of silver. On the other side of this reservoir is located the clean-out and in-take pipes for the pressure line, at the entrance of which a grizzly three by seven feet, of bar iron, is erected for the purpose of preventing small rocks and other extraneous matter from entering the pressure line. This pressure pipe line is 5,200 feet long and has a total fall of 1,020 to the water wheel, giving a static head of 443 pounds per square inch, and average running pressure of 430 pounds. This line varies in diameter from twelve inches at the reservoir to eight at the wheel, and is buried from



INTERIOR OF POWER HOUSE, SHOWING SWITCHBOARD AND GENERATOR

looked to the hills for the supply and found it. They have tapped seven small streams, or creeks, and have established a gravity system of collecting and delivering the water at the proper points, to secure the desired results. The accompanying illustrations will give a clear idea of how the work is performed. At the point where the water is collected from the various streams, are located the outlet and overflow pipes, which are fitted with a sand gate, the entire top being covered with a wire netting to keep out leaves and other refuse matter. Owing to the loose nature of the soil, it was found impos-

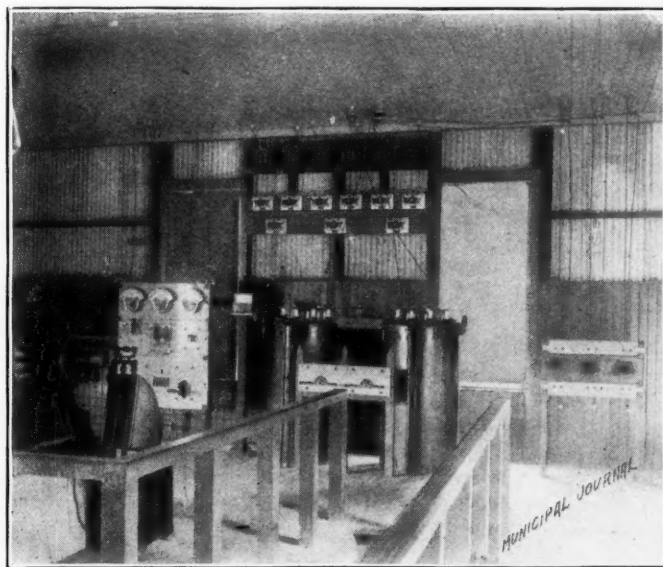
* Superintendent of the Electric Light, Power and Water System of Healdsburg, California.



INTERIOR OF POWER HOUSE, SHOWING 200 H. P. PELTON WATER WHEEL AND GOVERNOR

one to twelve feet deep almost its entire length. It is connected with the thirty-six-inch Pelton water wheel by a six-inch geared gate valve. This wheel is designed to give two hundred horse power at the shaft, with a consumption of 129 cubic feet of water per minute at 1,000 R.P.M. and is provided with two nozzles. Deflecting hoods are employed to govern the speed, and they are controlled by an electric relay governor, one nozzle being provided with a hand gate valve for controlling it independent of the governor—this is for the purpose of economizing water at light loads.

On the generator end of the water wheel shaft is keyed a 1,400-pound steel banded fly wheel which forms one-half of the flexible insulated coupling to the generator; the other end of the shaft carries a pulley for driving the two-and-one-half K. W. Westinghouse four-pole direct current excitor for exciting the generator fields, lighting the power house and engineer's cottage. The 123 K. W. three-phase S. K. C. generator is directly connected to the water wheel by



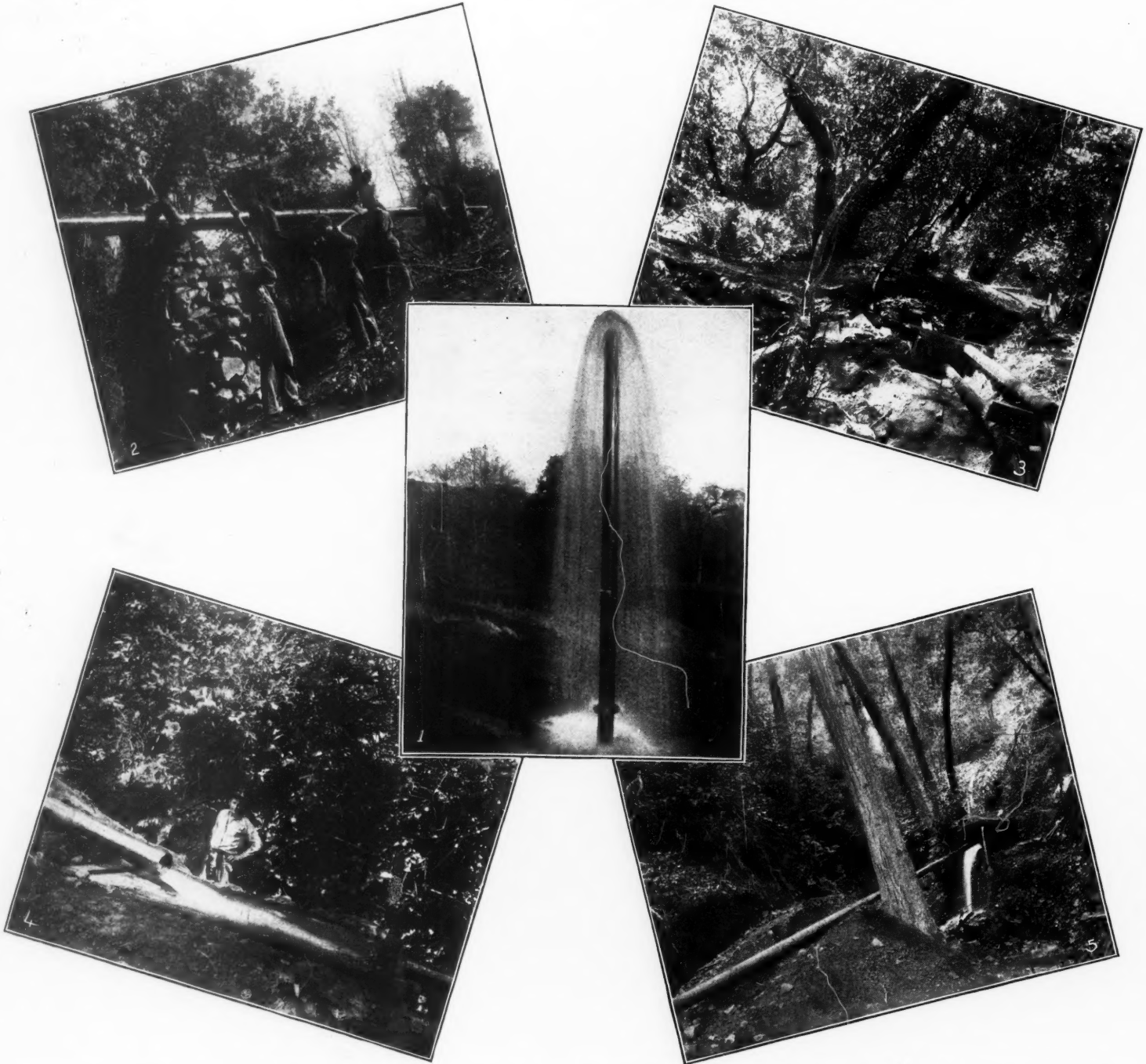
INTERIOR OF SUB-STATION AT HEALDSBURG

a flexible coupling, and is wound over a line voltage of 6,000, dispensing with step-up transformers.

The marble switchboard is provided with three ammeters and one voltmeter with commutating switch, of the Stanley Instrument Company make; two static ground detectors, rotary field switch, three Martin 6,000 volt main switches, giving two breaks of 14 inches each; two choke coils and three S. K. C. lightning arresters are inserted in each leg of the three-phase circuit at the power house.

one long span of 575 feet where iron wire is substituted for aluminum on the telephone lines.

At the sub-station in Healdsburg the line is provided with the same number of choke coils and lightning arresters as at the power house, also the three Martin high potential switches. It terminates in the two 60 K. W. oil insulated, water-cooled, step-down S. K. C. transformers, which are provided with regulator heads and step-down from 5,500 three-phase to 2,200 two-phase.



1.—STANDPIPE OVERFLOWING AT HEAD OF 10-INCH GRAVITY PIPE RIM. 2.—WHERE GRAVITY PIPE LINE CROSSES A DEFILE. 3.—METHOD OF TAKING WATER FROM ONE OF THE CREEKS. 4.—SHOWING HOW STREAM IS PROTECTED BY SCREEN AT HEAD. 5.—TAKING WATER FROM ANOTHER CREEK

THE METHOD OF TRANSMISSION

The transmission line from the power house to the sub-station in Healdsburg, is eight miles long, transposed twice in that distance, making one complete turn. Sawed red wood poles, from 26 to 40 feet in length, are used on this line, set 42 to the mile. The wire is No. 4 bare aluminum erected on Locke pins and insulators, the wires being arranged in an equilateral triangle having twenty-four inch sides. A No. 10 bare aluminum line is run five feet below the transmission lines, forming a complete metallic circuit for telephone purposes, and is not transposed at all. Russian river is crossed by

The low potential switchboard is supplied with hot wire volt and ammeters, static ground detector, motor switch and two 2,200 quick break S. K. C. main switches, all arranged back of board as at the power house, no live parts being exposed. At the present there are five and one-half miles of pole lines erected within the city limits, on which are erected the distributing wires of insulated aluminum, which vary in size from No. 6 to 0. There are also forty-three transformers, S. K. C. air cooled, varying from 40 to 100 lights each.

THE LIGHTING SYSTEM

The streets are lit by thirty-two General Electric 6-ampere A. C.

inclosed arcs which are burned every night from sun-down to sun-up. There are 2,800 incandescent business and domestic lights connected, which is a remarkable growth since the plant was started Feb. 13, 1900, with twenty arc lamps on our circuits. Of the 214 lighting services 20 per cent. are metered.

The city's water is derived from a brick cistern and filtration from Russian river, giving an abundant supply, which has proven permanent in the driest seasons. This cistern is located 100 feet from the river and tiling laid to the river. An underground gravel filter bed is located at the river end of this tiling and the water is conveyed to this bed by a conduit provided with a gate at the river end, which is closed in winter, the seepage and supply in the cistern being ample during winter months.

From the cistern the water is drawn up through 700 feet of 10-inch Matheson lock joint pipe by a Dow vertical triplex plunger pump, operated by a 30 horse power S. K. C. induction motor. This pump has a capacity of 30,000 gallons per hour at 42 R. P. M. The maximum lift in summer being 21 feet. It is forced through 1,600 feet of 8-inch Matheson pipe to the two storage reservoirs of a combined capacity of 570,000 gallons which are located 140 feet above the city.

The distributing system is arranged without dead ends and on the direct and gravity plan. It consists of $\frac{3}{4}$ of a mile of 8-inch, $1\frac{1}{2}$ mile of 6-inch, $3\frac{1}{2}$ miles of 4-inch, and 3 miles of 3- and 2-inch pipe, or a total of $8\frac{3}{4}$ miles of distributing mains, on which are set forty-four $2\frac{1}{2}$ -inch fire hydrants, 20 gate valves, dividing the system into five districts, which can be shut off for repairs, or in case of large fires in that district. The direct pressure from the pump of 100 pounds per square inch can be applied at any time. The pressure from the reservoirs is 60 pounds. A total of 51,895,220 gallons of water was

pumped from July 1, 1900, to July 1, 1901. Of this amount, 7,728,000 gallons were used for street sprinkling alone. The average consumption per capita, based on a population of 2,000 was $60\frac{1}{2}$ gallons, but that would hardly cover all, as there are fully 1,000 outside the city limits, the larger part of whom are being supplied. There are 340 water connections made of which 20 per cent. are metered.

FINANCIAL STATEMENT OF PLANT JULY 1, 1901

Total cash received from sales of lights for year.....	\$5,123.25
Total cash received from sales of water for year.....	4,066.95
Total water supplied to city for public purposes.....	1,498.88
Total lights supplied to city for public purposes.....	2,963.44
Total amount.....	\$13,652.52
Total operating and repair expenses for year.....	\$4,650.97
Paid two bonds of \$1,000 each.....	2,000.00
Paid interest on \$76,000.00 at 5 per cent.....	3,800.00
Paid sinking fund 6 months at \$160.00 per month.....	960.00

Total amount paid out.....	\$11,410.97
Balance to credit of plant.....	\$2,241.55
During the past year the light and water systems have been extended and improved at a total cost to the city of....	\$5,037.89
Original cost of plant.....	\$80,000.00

Total cost of plant to date.....\$85,037.89

Owing to our overloaded condition, and the demand for lights and water, steps will be taken at once to increase our power by another 200 horse power unit, which will be located at the sub-station in Healdsburg.

MUNICIPAL SOCIALISM IN GREAT BRITAIN

Finest Street Railway in Eastern Hemisphere—The "Direct" System of Labor—Rapid Spread of Civic Socialism—Yields Best Results

By James Boyle *

The London County Council has within a recent period taken hold of this "housing question" with a firm and comprehensive grip. There will not be as much compensation paid to owners of slum property as formerly. One scheme adopted by the London County Council provides cottages for 8,000 people; another (and this is on an estate outside of the London boundary line) will accommodate 6,000 people; and a site has been bought where 42,000 are to be accommodated in pretty little cottages, with gardens. London undertakes to provide for the artisan class as well as for the "casual," and in that particular it is in advance of Liverpool.

Strange to say, the housing question is getting to be an acute one in the country districts, as well as in the British municipalities. It is claimed that one of the reasons why the rural population flock to the cities is because many of the great landowners not only fail to erect decent residences for the laboring people, but some of them actually refuse to allow cottages to be erected on their estates, either because of æsthetic reasons or because the laborers' cottages would have a tendency to depreciate the value of the estates to prospective wealthy purchasers.

THE FINEST STREET RAILWAY IN EUROPE

Liverpool boasts of having one of the best street railroad systems not only in Great Britain, but in Europe. The corporation got control of the system in September, 1897, and has substituted electric for horse cars. At the date named, there were 68 miles of tracks within the city and about 7 miles in the surrounding district connecting therewith. There were then 287 cars, 156 omnibuses, and 3,623 horses. The municipality paid \$2,836,875, the purchase price covering tram cars, omnibuses, good will, vested rights, etc. In November, 1898, an experimental electric line 5 miles in length was opened. The work of reconstructing the new lines commenced in January, 1899, and by the end of 1900, 100 miles of lines were completed, including extensions. The overhead-trolley system is used. Of the entire 102 miles of the track laid down, only 6 miles were laid with

American rails and 5 miles with German rails; the remaining 91 miles were laid with rails of English manufacture. The prices paid were: For American rails \$42.58 per ton; German rails, \$29.79 per ton; and British rails, \$34.06 to \$44.39 per ton. The first 15 motors and 15 "trailer" cars for the experimental line were obtained from Germany. Subsequently, 15 Brill cars were obtained from the United States. The balance of the cars are of English make. The prices paid were: German cars, \$3,567.14 each; German "trailers," \$1,275.02 each; American cars, \$3,065.89 each; English cars, \$2,384.58 to \$2,856.63 each. In reply to my inquiry as to whether there has been any discrimination in favor of British rails, cars, electrical equipment, etc., as against American, German, or other foreign make, and whether the contracts were made under competitive bids, I am officially informed by the manager that tenders were invited and the most advantageous were accepted.

LOWEST FARES IN THE WORLD

Most of the cars in use and all those now being made are of what is known as the "standard Preston type." This car is shorter than most American cars, and has a "reverse" staircase for top outside seats. Each car accommodates 22 inside and 34 outside. In fine weather the outside of cars and omnibuses is preferred in England to the inside. Experience has shown that the style of car used in Liverpool gives the most satisfaction to the British public. There are no "summer cars" of the American type here; the weather is too variable. The fares charged are by distance. Two cents is the lowest fare for which 3 miles can be traveled; 5 miles 308 yards can be traveled for 4 cents; 7 miles 287 yards for 6 cents; and 8 miles 495 yards for 8 cents. The total traffic receipts during 1901 were \$2,341,915. The percentage of working expenditure to gross receipts is 63.7. Parliamentary powers are being obtained to devote not exceeding one-third of the net profits to the relief of the rates; the balance of net profit goes to a renewal or reserve fund. The total number of employees is 2,293, of whom 646 are drivers, 595 conductors, 117 inspectors, etc. Drivers and conductors work ten hours per day. Un-

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der the old system, before the municipality took charge of the tramways, the average working-day of conductors and drivers was fourteen and one-half hours. They are now paid 12 cents per hour. After twelve months' service with merit, 24 cents per week extra is paid for each period of ten years of approved service. Under the old régime drivers received \$6.80 per week, rising in eighteen months to \$8.51 per week; and conductors received \$5.95 per week, rising in three years to \$6.80 per week. The rate of pay under the old régime was for seven days a week. The system already extends outside the city boundary, and it is proposed to connect it with lines of a new enterprise in which American capitalists are interested, known as the South Lancashire Tramways Company, and which will form a network of street-car lines between Liverpool and important towns in South Lancashire.

THE "DIRECT" SYSTEM OF LABOR

Several municipalities have adopted what is known as the "direct" system of labor as contra-distinguished from that of the "contract" system. This is notably the case in London. The county council of London employs workmen on a principle which is "based on the rates of wages and hours of labor recognized by associations of employers and trades unions and in practice obtained in London." There is also a stipulation that "where in any trade there is no trade union, the council shall fix the rate of wages and the hours of labor, and shall from time to time revise the same as may be necessary." A great deal of opposition has sprung up against this system of direct employment, and the opposition has made much capital of the alleged fact that the bricklayers employed by the London County Council under the above conditions only lay down one-half or even one-fifth as many bricks per day as contractors get laid even by union labor. On the other hand, the claim is made that the municipality gets its work done cheaper in the end because it does not have to pay profits to contractors and other middlemen. Speaking generally, nearly all of the work done by municipalities, even where municipal ownership prevails, is by contract; but, as a rule, these contracts are given out subject to what is known as the "fair-wage" condition, which is substantially the wage condition adopted by the London County Council. In connection with this question of direct labor, it is interesting to note that many British railroad companies adopt it, they making all their engines and rolling stock themselves; and this, by the way, is given as one of the reasons why the outside British makers of locomotives are not able to meet foreign competition, because they have not got patronage enough to warrant them in keeping their plants up to date.

EFFICIENCY OF DIRECT LABOR IN LIVERPOOL

One of the greatest examples in England of "direct" labor is furnished by the Liverpool Dock Board. This board formerly did all its work itself. The question of cost did not primarily come in, but the principal reason for direct labor was the belief that it would not be safe to trust contractors with the kind of work to be performed. For two or three years past, however, a great deal of work has been given out by contract, and it is claimed that the contract work is done just as well as that performed by direct labor, and much cheaper. One of the greatest objections urged against the employment of direct labor by municipalities and large corporations is that the tendency is to perform the work "too well"—that is, to make it unnecessarily heavy and substantial without any discrimination being shown as to work that can be lightly done, the object being to "stringout" the job. And the further objection is made that when a municipality or public trust has its work done by direct labor, the employees do not work nearly as hard as do employees of private contractors, and, as a rule, get more pay than those who work for contractors.

RAPID SPREAD OF CIVIC SOCIALISM

The advocates of municipal socialism in Great Britain have been gradually increasing their demands, and now a point has been reached where even many supporters of that system feel called upon to cry a halt. Within the last year or two, an active opposition has grown up in Parliament to municipal trading. There are two schools of thought among municipal socialists. In the first school are those who not only advocate the municipalization—and in certain lines the nationalization—of such enterprises as waterworks, street railroads, electric lighting and power supply, and railroads, but who favor the public control of all departments of human production and energy—

not suddenly, but by degrees—and the abolition in time of the private manufacturer, trader, or tradesman. These form the extreme school of national and municipal socialists. Their number is possibly increasing, but, without a doubt, their opponents are in an overwhelming majority, even among those who favor the present stage of municipal socialism. Speaking generally, the enterprises of municipal socialism in Great Britain have been within well-defined lines. In a recent article in a London periodical (*The Queen*, March 8, 1902), the Hon. Lionel Holland says:

"Those, finally, who contend that municipal trading trenches upon the proper sphere of individual enterprise betray a singular want of the faculty of discrimination. There is a class of undertakings which inevitably tend to become monopolies, when the public loses the advantage of competition—the great merit of private enterprise—which concern the satisfaction of wants common to the community, when, by resigning their supply to private speculators, the community is deprived of effective control over matters vital to its convenience; whose functions are of a semi-public nature, and require the sanction of the law to be put into operation. Such undertakings are clearly differentiated from the ordinary operations of private traders; they can only with justice and advantage to the community be vested in a representative body, to be conducted for the profit and convenience of the public."

The above may be accepted as an accurate definition of the limitations laid upon most of the experiments in municipal socialism so far undertaken in Great Britain, although there are plenty of examples indicating the all-embracing programme of the advanced municipal socialists.

It has got to be quite the fashion in England to laud the municipality as being of far more vital concern to the people than Parliament. The claim is made that local government in Great Britain is as nearly ideal as it can be. One of the greatest advocates of municipal socialism, Mr. George Haw, in a recent standard work, "Municipal Government the Hope of Democracy," says:

"Neither America nor France, under republics, excels our municipal code. We have the largest franchise and widest powers. Americans themselves admit that our municipal institutions are fifty years in advance of theirs."

SUGGESTED CHANGES IN MUNICIPAL CODE

A number of changes in the municipal code of this country are being suggested, but it appears that most of the apostles of municipal socialism concede that the present code is amply sufficient for the widest development of their views. Mr. Haw, in his work just quoted, says that "the fault with us is that we have not learned to make full and good use of what we have won." Speaking of the democracy of Great Britain, he adds: "It has now no need, as of old, to look to Parliament for reform, but to look to itself."

Municipalities are held by an ever-increasing number of people in this country to be the legitimate and most practical medium for the development of the principles of socialism, and voluntary organizations for this purpose are being discarded, the existence of statute law being deemed necessary, both to do and to restrain, to insure success.

MUNICIPAL SOCIALISM YIELDS BEST RESULTS

The claim is made that the best-governed towns in Great Britain and the towns that have the least taxes are those where municipal socialism prevails. But this claim is strongly controverted, especially as to ultimate results; and the opponents of municipal socialism charge against that system a tendency to extravagance, jobbery, official indifference, and lethargy, and the broader charge is made that the system contracts and paralyzes individual effort and enterprise. Yet it should be kept in mind, in connection with this criticism, that municipal socialism has in some cases been embarked upon almost out of necessity—as, for instance, in the case of the housing of the poor in Liverpool—where private enterprise has not only failed absolutely to solve the problem, but has not even alleviated its most crying evils.

Two observations are appropriate to be made in conclusion: Speaking generally, municipal government in Great Britain is honest, intelligent, and energetic; and, as a rule, politics has but little to do with the engagement or retention of civic employees.

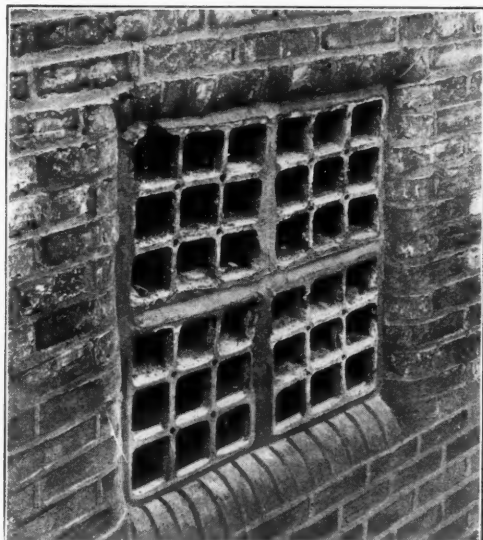
THE END

ALL WIRES PUT UNDERGROUND

First City in the "Nutmeg" State to Put Wires Underground—How the Work Was Accomplished—Appearance of the Streets Improved—Conduit Should Be Owned and Operated by City

*By F. H. Oldershaw, C. E.**

THE city of New Britain has, and always will be, a progressive city, and its citizens are continually on the lookout for improvements in its municipal affairs. The last step taken is one that will beautify the city, as it will remove a large number of unsightly poles and wires from the main thoroughfares, is the laying of a subway or conduit for all underground electrical wires.



TRUNK CONDUIT ENTERING MANHOLE

The city can well be proud of its position as the pioneer city of this state in the movement of building and maintaining its own conduits.

A recent session of the last Legislature passed an act authorizing the city of New Britain to build, construct and maintain, in any street or highway, or in any part of street in said city, main

or lateral conduits, with manholes, and all other appurtenances, pertaining to conduits, for telephone, telegraph, fire-alarm, electric lights, and all other electric wires now or hereafter used in said city, and to cause all such wires to be placed in said conduits, and to charge for the use of said conduits an annual rental.

THE BEST DUCTS FOR CONDUITS

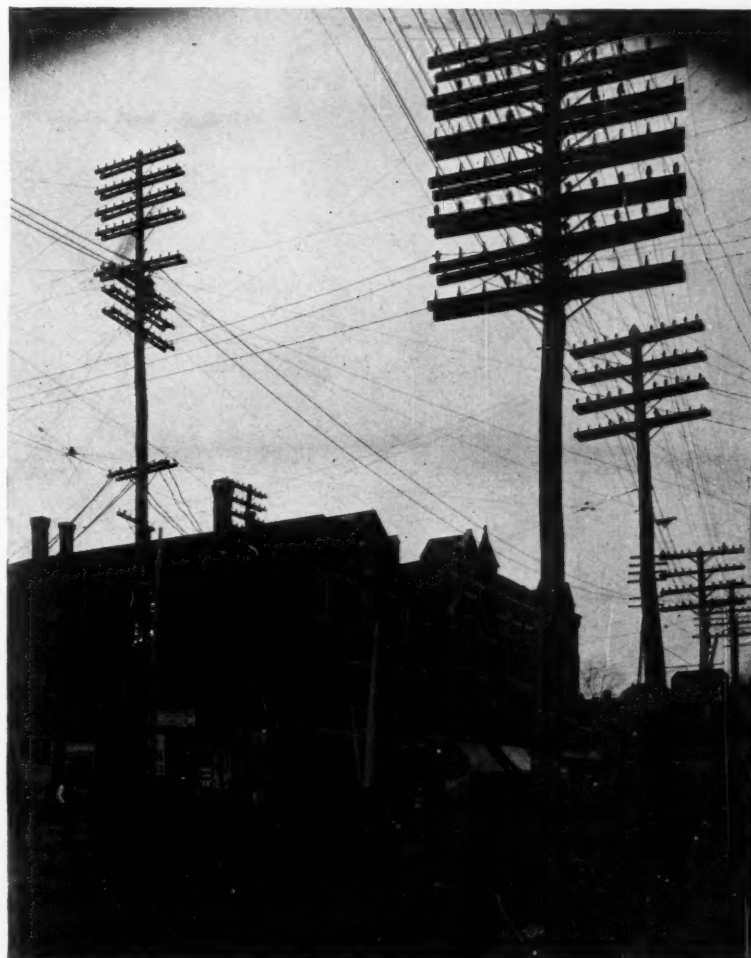
After a thorough study of the different kinds of conduits used for underground electrical wires, the vitrified clay multiple ducts made by the American Vitrified Conduit Co., were selected as being the best. All the various ducts were studied, among them being cement-lined pipe, creosoted wooden pipe, vitrified clay and multiple terra cotta ducts. The best electric conduit is the one which best protects the electric cable, and to accomplish this, it must be, as far as possible, a perfect insulator. It must be impervious to water, and not affected by heat or cold, and must withstand the action of gases, acids and alkalis. It should also be proof against electrolysis, corrosion and decay. It must have a smooth interior and water-tight joints. The only material which is recognized as best meeting these requirements is the vitrified clay, and therefore, as I have stated before, the commission has decided on a vitrified clay.

The conduits used in the New Britain subway were four feet in length and consisted of two, three, four and six duct conduits, according to the number of ducts necessary; for instance, on Main street we laid a four-duct conduit on top of a six-duct conduit for the electric company, thus giving them ten (10) ducts, and at the side of these a six-duct conduit for the telephone company. The duct openings were $3\frac{1}{4}$ inches square and will admit easily the largest size of underground cables. This square shaped duct has an advantage over the round shape as a flat surface offers less resistance to a cable than a concave surface. A cable is pliable, yet not limp. The curves it receives from a reel give it a snake-like movement as it passes through the duct, and in a straight run cause it to bear first to one side, and then the other. If there is a bend in the run, the cable clings to the convex surface of the duct. There is no difficulty

in putting one cable in a round duct, the difficulty is in putting two or more in, as the circular walls urge the cables up the sides and the two cables form a double spiral through the ducts, so that in order to put in a third cable, the two must be taken out first and all put in together. The flat and upright sides of the square hole ducts that we used, oppose this spiral tendency of the cables, so that after the first, a second or third cable may be easily drawn in.

CONSTRUCTION OF A CONCRETE BED

In our construction, the conduits were laid on a four-inch bed of concrete, consisting of one part Portland cement, three parts sand and five parts one-inch stone. The conduits were laid to such a depth that they would have thirty inches of covering on top. In laying the conduits an iron dowel-pin was used in setting abutting ends of sections and all joints were close matched. This dowel-pin used was three or four inches long, with such a diameter as would fit the dowel holes in ends of conduit snugly. Two pins were required for each section of pipe. Every joint was protected with a single layer of coarse burlap, soaked in asphaltum and pitch compound, fitting tight about the joint. The burlap consisted of a strip eight inches wide, and overlapped twelve inches. The burlap joint was protected by a layer of Portland cement mortar. A mandrel six feet long, the end being three inches square, was used for the purpose of centering the ducts and keeping them in perfect alignment. Where one conduit was laid on another, they were separated throughout their whole length by a bed of cement mortar. The method of laying the conduit was as follows: When possible, the



NETWORK OF WIRES ON MAIN STREET

* City Engineer, New Britain, Conn.

work was started from a manhole, although if desired or necessary, it can be started at any point of the line. A trowelful of mortar was placed on the concrete wherever the joint was to be made. When the length of conduit rested firmly on its bed, two dowel pins were inserted. A strip of creosoted burlap was then placed so that it lay equally divided under the end of the conduit laid and that of the next to be laid. The next length was then put in line and dowel pins

then thrown in, (the concrete having set in the meantime), and tamped well, so as to fill the trench to within eighteen inches of the top. Two distributing ducts were then laid about ten inches apart, each duct connecting with its respective manhole and having a separate system of service boxes or handholes. Thus each system, electric and telephone, are distinctly separate, having its own trunk line or conduit, manholes, distrib-

uting ducts and junction boxes. Ducts passing manholes and service boxes and not entering them, do not show on the inside at all. This distributing duct consisted of three-inch lap-welded wrought iron pipes, pains being taken to have the inside free from all scales or roughness which would injure the electrical cables. All joints were threaded and provided with screw couplings. This distributing duct was coated with a preparation consisting of ten parts, by weight, of refined Trinidad asphalt, and thirty parts, by weight, of coal tar pitch, to which was added sufficient dead oil to make a smooth, tough and tenacious coating.

THE SERVICE BOXES

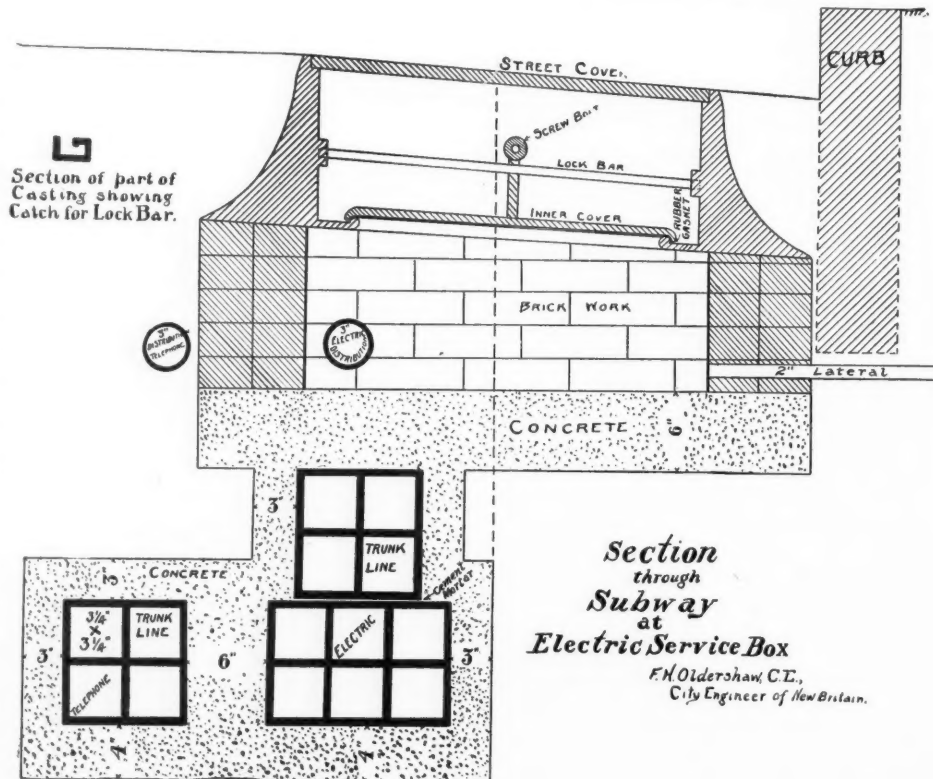
The service boxes are laid at the discretion of the engineer usually one for each building or lot. Their location and distance apart depends wholly on the number of blocks, stores, houses, etc., to be supplied with the different services or accommodations. One service box connects buildings or properties on the street that are opposite to each other, or nearly so. The service box on a subway may well be compared to a sewer hub on our sewers, except that more than one building can be

connected with a service box, while only one connection with the sewer is accommodated by a single hub. These service boxes were thirty inches in the clear, and like the manholes, had eight-inch walls of at least six courses of brick work, hard burned sewer brick being used. The foundation for these boxes was also six inches concrete. The top casting for these boxes was identically the same as those for the manholes, and had the same fittings, the frame weighing about 1,050 pounds. From these service boxes, laterals were run to points six inches inside of the curb and to such

SECTION OF TRUNK CONDUIT

adjusted, and the two lengths pushed tight together; the mandrel was then passed through the ducts for perfect alignment and to insure clear openings. If everything was found correct, the burlap was drawn tight and lapped, and then plastered with a coat of mortar. In places where a bend or curve in the line was necessary, short pieces were used and cut at an angle. This was necessary in our work, as the subway was laid about two feet from the curb, and it was necessary at some points to run around the catch basins.

Manholes five feet by five feet by seven feet deep were placed at all street intersections, and if the length between streets was over 700 feet, one was placed between. The distance between manholes on our system ranges from 200 to 450 feet. The foundation for the manholes consisted of six inches concrete. The walls of the manhole were eight inches thick and built of the best quality hard burned sewer brick. The walls were carried up to such a height that the casting for the top came in conformity with the street grade. The casting consisted of a frame, street cover, inner cover of cast iron, a lock bar of wrought iron, and a screw bolt of gun metal. The inner cover was fitted with a hollow rubber gasket to secure a water-tight joint. The lock bar of wrought iron caught in two slots, one on each side of the casting, and the screw bolt went through the center of the lock bar and onto the top of the inner cover, so that after the rubber gasket was fitted by screwing on the bolt, the cover could be made perfectly water-tight. The whole top weighed about 1,700 pounds. The conduit was so laid as to come flush with the inside face of the manhole walls. After the trunk line or conduits were laid from manhole to manhole, and covered on top and sides with three inches of concrete well tamped, one-inch creosoted boards equal in width to that of the conduit, were laid on top of the concrete, after which loose earth was



Section
through
Subway
at
Electric Service Box

F. H. Oldershaw, C.E.,
City Engineer of New Britain.

points as was directed by the engineer; most of the laterals were two-inch, but those at the terminals of the subways were three-inch. The pipes for these laterals were of same quality as that for the distributing duct and underwent the same preparation. When laying these laterals, a No. 9 B. and S. galvanized iron drawing-in wire is put in each one and the ends fitted with a wooden plug. The company using these laterals completes the connection from the ends laid by the city to such buildings or places as they wish to supply with their service. Thus we have the service complete. The cables run through the trunk duct or conduits to the manholes. At the manholes service is taken from these electric cables through the distributor to the service boxes and thence through the laterals to the building or place to be supplied with the service.

RODDING

After the construction work was completed, each duct of the trunk system was rodded from manhole to manhole, and each distributing duct rodded from manhole to service box, and from service box to service box, and a No. 9 B. and S. drawing-in wire left in each one. These rods are made of oak and are four feet in length with a brass screw cap on the ends. One man gets into one manhole and starts the rodding with a length of rod, and by screwing on additional lengths, pushes the rod through to the next manhole. When the second manhole is reached, he inserts the end of the drawing-in wire into a small hole in the cap of the last rod and a second man in the second manhole pulls the rod through with the wire attached until the wire enters the manhole. Thus the rodding is continued until each duct of the trunk system, and all distributors are wired. In our system this work was accomplished with great ease and success, no obstruction of any kind being met in the rodding process in the whole system. According to an old adage, "The eating is proof of the pudding," and so I say the rodding is proof of the subway.

RENTALS

Owing to the incompleteness of our figures and to the fact that no report has yet been made, I cannot treat the subject of rentals as I would like to. According to our charter the sum to be charged for the rentals of the conduits must be determined upon the following basis, viz.: A reasonable interest upon the cost of construction, and the creation and maintenance of a sinking fund for the repair, maintenance and costs of conduits, manholes, etc. Suppose that one system completed (not including laterals), cost for construction, engineering and superintendence, a certain sum which we will call "y." The sinking fund for repairs, maintenance and cost of conduits, etc. (this fund, of course, includes subway commissioner's salaries,) estimates at a sum we will call "x." The interest on our bonds (which are twenty year bonds), amounts to the sum we will call "z." For a twenty year basis, this would make our cost of subway $\frac{y+z}{20}$. Now if the number of duct feet laid was represented by "a," our rental would be $\frac{x+y+z}{20a}$ per duct foot. Baltimore has a system very much like ours, and this rental figures 7½ cents per duct foot. In the same way, we figure the cost of laying and maintenance of our system of laterals, and by dividing by the number of feet of laterals laid, estimate our rental for laterals used. Thus having the measurement of all trunk ducts and distributors between manholes and service boxes, as shown on the map, and all laterals, when a company goes into our subway, we figure the number of feet conduit, and number of feet laterals used, and charge them so much per foot conduit, and so much per foot laterals used.

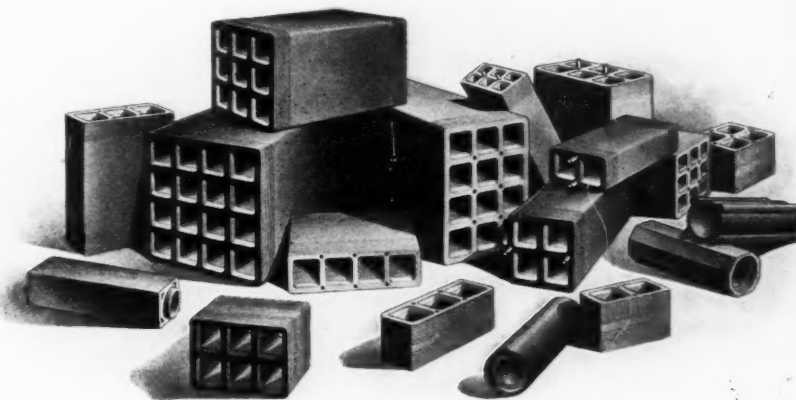
HIGH AND LOW TENSION WIRES IN SAME TRENCH

A main feature of our subway is the fact that the electric light conduits and telephone conduits are side by side in the same trench, being separated by only six inches of concrete. The telephone company makes strenuous objection to this on the ground that their service would be interfered with by being in the same trench with the electric light wires, but according to electrical experts, this is not so. Mr. Walter C. Allen, electrical engineer of the District of

Columbia, when written to requesting information as to the joint occupation by electric light and telephone companies of conduits, replies as follows: "I beg to state that each corporation operating in the district (with one exception), has its own system of underground conduits. The one exception is in the case of the Postal Telegraph Cable Company, a portion of whose cables are in the ducts of the Potomac Electric Power Company. These ducts also contain cables belonging to the latter company, and carrying voltages from 125 to 6,000. This department has also a few short lengths of cables used for telephone and fire-alarm signal purposes in ducts of one of the electric lighting companies, in which there are also three wire Edison mains and cables for the series of arc lighting system. No attempt has been made to keep the different systems of conduits on opposite sides of the street. They do not, however, occupy the same trench, as they were built at different times, but in certain sections they are as close together as it is possible to build them without one interfering with the other." From another inquiry we learn that in other places, the telephone and electric light companies use the same manholes, no interference with the telephone company's service being experienced. Therefore, we are sure there will be no trouble of this kind in our subway, for both companies are separated, having as I have before stated, their own conduit, manholes, junction boxes and laterals.

SHOULD BE OWNED BY CITY

In conclusion, I think it may be said that the experience derived so far from the practical operation of electrical subways has con-



DUCTS OF VARIOUS CHAMBERS

firmed that it is possible to successfully operate all classes of electric conductors underground in cities. Mr. David R. Walker, chief of the Electrical Bureau of Philadelphia, says that after testing and having in operation an underground system for the arc light wires, and for telegraph and telephone service, his experience is that it can be made to work in a manner that will greatly improve the service. There is no doubt that the underground system is a great saving to telephone and electric companies in cost of maintenance and absence of interruption to service. All the telephone and telegraph companies in the larger cities, keeping up with the progress of the times, are putting their wires underground as fast as possible and the cry seems to be at present, "The overhead wires must go underground."

Now comes the question, who shall own the underground systems in our city streets? We own our own water system and sewer system, and I firmly believe we should own our own underground system for electric wires. The city streets are under municipal ownership, and I believe everything put under our streets should be under their protection also, for under municipal direction, a system can be built that will accommodate all companies, and thus save the tearing up of our streets by every company that has overhead wires in our cities. There can be no loss to the city in a financial way, for they can charge rental sufficient to meet every expense incurred. The cry at present seems to be municipal ownership also of our lighting systems, and if this comes to pass, we want our subways to put the wires into, so I am firmly convinced that the underground system should be under municipal government.

A MONEY MAKING MUNICIPAL PLANT

State Law Required City to Pay Inflated Values for Private Plants—Price of Gas Rather High—Cost of Street Lights Lower Than Those Furnished by Corporation

*By Alton D. Adams**

SOME years ago the City of Westfield, Mass., under the provisions of the State Law, purchased the plant which had been operated for a long time by a private corporation and converted the same into a municipal plant, consisting of both electric light and gas. This public plant operates a large number of street lamps, supplies gas and electrical energy to private consumers at moderate rates, and, besides, pays a handsome sum above all expenses into the town treasury annually.

The following facts as to the operation of this plant relate to the fiscal year ending June 30, 1901. During this year the town plant sold 15,914 cubic feet of gas to consumers at the average price of \$1.63 per thousand cubic feet. Besides the gas sold 329,500 cubic feet were used in public buildings, and 222,800 feet were consumed at the works and offices.

THE CITY PROFITS BY THE BUSINESS

The total expense in the operation and distribution of the gas plant amounted to \$13,388.98, and the receipts from the sale of gas, residuals and other gas items were \$27,974.72, leaving a net profit of \$14,585.74 on the gas business. During the year an average daily number of 95 arc street lamps of 2,000 nominal candle power each, and 7 incandescent street lamps of 25 candle power each were operated by the electric plant. These street lamps were in use for illumination 7.3 hours per day and 30.4 days per month on an average. Allowing a rate of 0.25 watts for each candle power of arc lamps, the energy supplied to the 95 arc street lamps during the year was 126,494.4 kilowatt-hours. At 3.5 watts per candle power in the incandescent street lamps, these lamps consumed 1,631.1 kilowatt-hours during the year.

At the close of the year in question, 21 arc lamps of 2,000 nominal candle power each, and 1,204 incandescent lamps of 16 candle power on the premises of private consumers were operated by the municipal plant. The rate charged for the 16 candle power incandescent lamps was \$1.25 per month for each lamp burning every night to 11 P. M., with less sums for shorter hours. The price charged for service to each commercial arc lamp was \$5.00 per month.

INTEREST AND DEPRECIATION INCLUDED

The total operating expenses of the municipal electric plant were \$8,039.4 during the year, and the income from commercial service for the same period was \$6,046.86, leaving the sum of \$1,992.60 to be charged to electric street lighting. Interest at the rate paid on town bonds computed on the investment in the electric plant amounted to \$1,659.00 for the year. Depreciation charged at the legal rate of 5 per cent. on the same investment, less \$29.32, the net gains in electric jobbing, represented \$2,182.23. The sum of the \$1,992.60 for operation, plus the interest and depreciation charges is \$5,833.83, the total cost of electric street lighting to the town. As it was found above that 128,125.5 kilowatt-hours were supplied to street lamps during the year, the cost of this service to the town was 4.55 cents per kilowatt-hour. As each 2,000 candle power arc lamp operated 2,663 hours during the year, it consumed 1,331.5 kilowatt-hours, costing \$60.58, on the basis of 0.25 watt per nominal candle power.

This rate for arc street lighting is lower than that for any town in the state that contracts for the service with a private company. It should be noted, moreover, that of the \$5,833.83, the total cost of street lighting, only \$1,992.60 or 34 per cent. represented operating expenses, while the remaining 66 per cent. was made up of interest and depreciation on the investment in the plant. The especial significance of these figures lies in the fact that Westfield was forced to purchase its gas and electric plants by a suit on the part of the private corporations owning them, and was required to pay about one and three-quarter times the sum of the outstanding stock, bonds and notes of this corporation for its property. To this excessive first cost of the Westfield municipal plant is due the large percentage of interest and depreciation charges. Obviously, had the town plant been

built instead of purchased the low cost of street lighting would have been still smaller. Unfortunately, however, under Massachusetts law the town was not at liberty to build a plant.

STATE LAW REQUIRED PURCHASE OF PRIVATE PLANT

In spite of its purchase of plants at an inflated valuation, Westfield was able to show a very satisfactory ratio of net earnings to investment during the year in question. Net earnings for the combined gas and electric plants during the year amounted to the sum of \$12,593.14 from commercial business, plus the value of its street lighting. As there is no direct money payment for the street lighting, its value must be estimated, using the prices paid by other towns as a basis. An investigation of the prices paid for electric street lighting by the towns of Massachusetts shows that ten cents per kilowatt-hour is a fair estimate to put on the value of the energy supplied to the street lamps of Westfield. On this basis the value of the street lighting done by the town plant was \$12,812.55. This sum added to the \$12,593.14 from commercial service gives a total of \$25,405.69 as the net earnings for the year. The investment in the municipal gas and electric plants at Westfield amounted to \$150,000.00 on June 30, 1901, this being the total sum expended by the town on the plants, at and since their purchase. It thus appears that the net earnings of the town plants for the year in question above all expenses of operation amounted to 17 per cent. of the investment in them. The total charge to depreciation of its plants on the books of the town, at the legal rate of 5 per cent. on the investment, was \$7,138.66 for the year, leaving \$18,267.03 as clear earnings on the investment. To this sum must be added gains of \$319.92 in jobbing by the gas and electrical departments, making the total net earnings above depreciation \$18,586.95. This sum is 12.3 per cent. of the total investment in the plants.

A GOOD SHOWING FOR PUBLIC OWNERSHIP

Leaving out all computation of the value of its street lighting, the net earnings from operations plus the gains in jobbing amounted to \$12,912.06 during the year. Interest paid on the bonds issued to purchase the plants amounted to \$4,048.34 in the same period, and this added to the charge of \$7,138.66 for depreciation gives a total of \$11,187.00 to be deducted from the net earnings. The result of this deduction is \$1,725.06 free and clear above operating expenses, interest and depreciation charges. In other words, the town plants did the large amount of street lighting above mentioned, supplied gas and electrical energy to private consumers at moderate rates, laid away 5 per cent. for depreciation, paid interest on their bonds and all operating expenses, and turned \$1,725.06 into the town treasury besides.

AFFAIRS OF THE GAS PLANT

The gas plant at Westfield produces coal gas exclusively and has a maximum daily capacity of 86,000 cubic feet. The greatest output in any day during the year was 78,500 feet. The distribution system for gas contains 66,292 feet of mains, ranging from 1.25 inches to 8 inches in diameter. There are 2,924 feet of six inch and 2,073 feet of eight inch mains.

At the town electric plant there are three steam boilers rated at 240 horse power, and three engines rated at 290 horse power. The plant also contains seven dynamos with a total capacity of 210 arc lamps of 2,000 nominal candle power each, and 1,150 incandescent lamps of 16 candle power. The electric distribution system includes 150,467 feet of wire and 501 poles. These wires extend over 12.4 miles of streets. During the year the electric generating station consumed 417.4 tons of coal and 250.2 tons of coke. Carbons used in arc lamps numbered 38,200. The total earnings of the electric plant including the value of street lighting were \$18,857.41. Dividing this sum by the figures for total tons of fuel consumed shows the income to have been \$28.24 per ton. In the year of 1900, the income of the Edison Company at Boston was \$28.75 per ton of fuel burned.

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THE NEW ORLEANS DRAINAGE PROBLEM

The Greatest Sewer Problem in the Country—Some of the Political and Physical Problems Which Have to Be Considered—Observations of an Expert Engineer—Particulars of Its Solution

*By Ira W. M'Connell, C. E.**

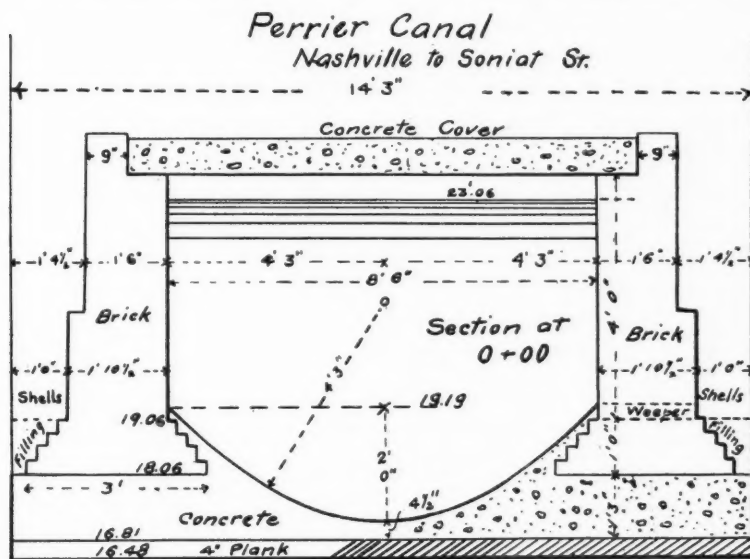
THE city of New Orleans is now carrying out a scheme of drainage and sewerage which when complete will give the district embraced a most comprehensive system. To the casual observer, it seems most remarkable that some adequate plan was not adopted long ago. From the time of the founding of the city up until the present,

charge from street gutters and other subsidiary drainage channels. At times of heavy wind from the proper quarter, the waters of the Gulf of Mexico are blown up into Lake Pontchartrain, and thence backed up into the drainage ditches of the city, flooding cellars, and playing havoc with any construction excavation which may be in process of completion. Again, in seasons of high water in the river, the town is considerably below the river level, and the seepage in trenches and other excavations becomes a serious problem. So that at certain seasons of the year the inhabitants are literally between the devil, in the shape of the river and the deep sea. Add to this, too, the fact that a rainfall of two inches in twelve hours is of very frequent occurrence, while a precipitation of over five inches occurs once or twice a year, and it will be seen that the water problem for New Orleans, both externally and internally, is one of great moment.

THE PLAN OUTLINED

The engineers employed by the city decided to build separate conduits for drainage and for sewerage. For drainage purposes, there will be a series of lined and covered canals of the general outline shown in the attached drawing, and varying in width from five feet to twenty feet. The canals are so located as to collect as rapidly as possible by means of street gutters the drainage of the territory adjacent. These canals in turn discharge into open canals leading to a series of pumping stations, where the water is lifted and discharged into basins leading into Lake Pontchartrain.

During the year just past, construction has been carried on under a number of separate contracts and these notes are the result of observations made while superintending construction on the two contracts known as the Lowerline System, and the Nashville Avenue System, respectively.

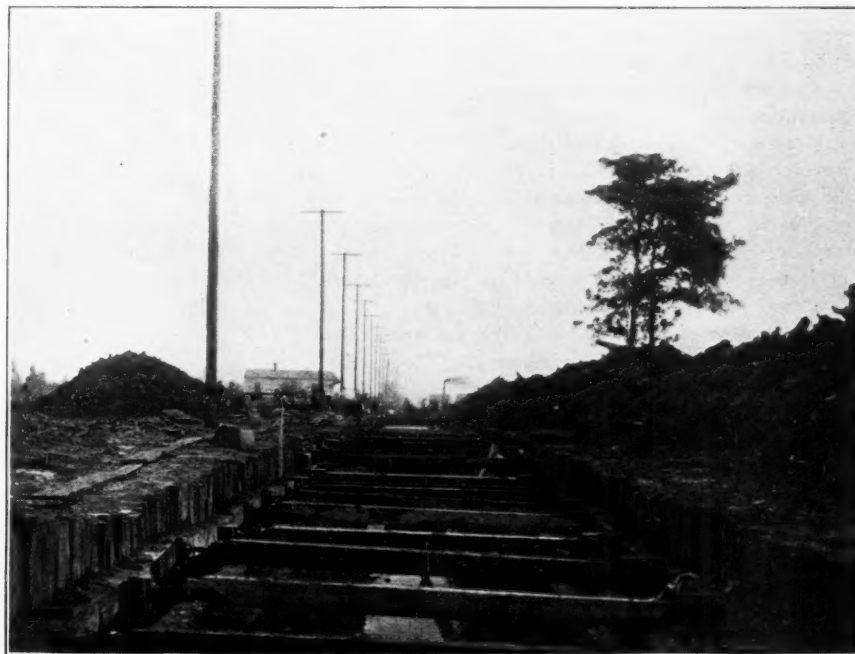


all drainage and sewerage has been carried away in open ditches. During the hot weather the ditches give off a most offensive odor, and are veritable breeding places for mosquitos and disease.

POLITICS AND EXPENSE INVOLVED

Owing, however, to the great expense of such an undertaking, and also the quarrels of opposing political rings, all efforts to introduce this greatly needed improvement came to no result until about four years ago. Then a bill passed the Legislature creating a special Sanitary District, embracing New Orleans and Algiers, authorizing the appointment of two non-partisan commissions; one known as the Drainage Commission of New Orleans, the other known as the Sewerage and Water Commission of New Orleans. The Drainage Commission was first organized, and the present year will see the completion of their plans.

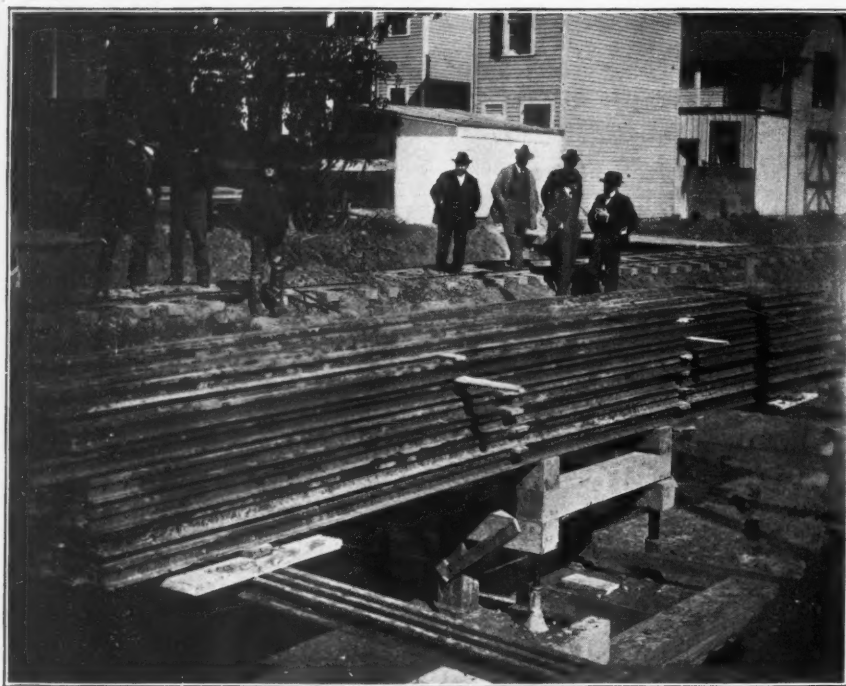
The City of New Orleans lies, in a general way, between the Mississippi River and Lake Pontchartrain. The strip of land between the river and the lake is about ten miles in width, with a general slope from the river toward the lake. There is presented, therefore, the rather unique problem of carrying storm waters away from the water course. All of the country, however, is low and very flat, so that natural drainage is not to be had. In fact, throughout the city are found a number of broad swells or ridges which have been produced in times past by inundations from the river at periods of high water. If artificial drainage were not provided, the territory lying between these ridges would be constantly flooded. The present drainage consists, then, of a series of large, open canals discharging finally into Lake Pontchartrain. These canals are fed by smaller intersecting ditches, which in turn collect the dis-



LOWER LINE SYSTEM—10' CANAL, DITCH 17' WIDE

By following the drawing showing the cross-section of canal, it will be seen that the general construction is as follows: First, the trench is excavated to grade and a flooring of four-inch cypress is laid in the bottom. This flooring consists of planks laid side by side across

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NASHVILLE AVENUE TEST

the ditch, with a longitudinal plank spiked down on top on both sides of the ditch. Upon this flooring a concrete foundation is laid. Upon the concrete foundation the brick walls forming the sides are built.

Excavation has been carried on by three methods: Hand work, steam shovel, and "Orange Peel" excavators. Wherever possible, hand excavation has been avoided, not alone on account of expense, but because the machines make so much greater headway. The soil is variable in character, being for the most part a sticky, heavy clay loam, which adheres to everything it touches. Any sort of excavating tool, be it spade or steam shovel, must be treated to a generous spray from the hose in order to free itself from the mud picked up. In the bottom of nearly all the trenches, however, there was found from four to six feet of fine, black river sand. When free from surplus water, this sand packs hard and stands readily behind sheeting. Under a heavy rain, however, it becomes almost fluid and oozes very rapidly through any cracks or holes leading into the excavation.

A number of places where the flooring was not covered with concrete or anchored down by braces, the whole bottom rose during the night and stood in the morning some four or more inches above grade. In one instance, too, a heavy deposit of sand was encountered which ran into the trench as fast as it could be removed, so that the only evidence of anything having been taken out was the settlement of adjacent sidewalks, on both sides of the trench. As the excavation continued, the settlement grew in extent until it threatened to wreck houses standing well back from the street. At this stage the contractors concerned abandoned the ditch until such time as they could get lap sheet piling of unusual length driven, hoping thus to be able to stop the influx.

Another peculiar feature is the apparent inability of the soil acting as a dam to retain water. In one instance a stretch of work had been finished and allowed to fill with water. A second piece of work was begun some fifty feet away from the first piece, the intervening ground being left undisturbed in order to avoid the necessity of handling the seepage water from the finished work. In the course of a few hours the old ditch broke through and flooded the new excavation. As there was a head of only ten feet it would be reasonable to suppose that a bank of earth fifty feet thick

and standing in its natural state would make a safe dam. It broke through, however, and confirmed a pretty well established suspicion already formed that the addition of a sufficient amount of water deprived the soil of any tenacity it may have possessed, and converted it into a more or less fluid mass. At occasional intervals enormous cypress stumps were encountered, buried some six or eight feet under the surface. In many places they were so large as to take up completely the width of a twenty-foot ditch. As they were decayed very little, light charges of dynamite were used to break them out.

For the greater part of the work, the streets were too narrow to allow of spoiling excavated material along the street. This necessitated transporting upward of fifty thousand cubic yards of earth over distances varying from five hundred to three thousand feet. Part of the earth was hauled away in dump carts, but the major portion was loaded direct from the excavator into skips holding two cubic yards. The cars were then run to the spoil bank and the skips unloaded by derricks.

COST OF EXCAVATING

The cost of excavation by hand for trenches ten feet wide and not over eight feet deep has averaged twenty cents a yard. On machine work usual experience seems to indicate that the steam shovel is a more efficient excavator than the Orange Peel. There are certain limitations on the steam shovel, however; it of necessity follows up its work and must therefore travel on tramways along side the excavated trench. In other words, the machine *straddles* the ditch. With a narrow street and a wide ditch, it will be evident at once that the steam shovel cannot be used since it would take all the street room not necessary for the ditch, and it would, in extreme instances, be wider than the street. The Orange Peel, on the other hand, runs ahead of the ditch and is therefore always on solid ground. The great weight of the steam shovel requires unusually good bracing and sheeting, and in case of heavy rains, most elaborate precautions must be taken to prevent the ditch from caving and taking the machine into the hole. On this particular work, however, on account of the delays for bracing and for placing floor planks, it has been found that the Orange Peel operates about as efficiently as the steam shovel. The cost of excavation by machines has varied from nine cent to forty-five cents a yard; average being about twenty-five cents. The figure of twenty cents per yard for hand work is for the earth cast upon the bank. The figure twenty-four cents for ma-



NASHVILLE AVENUE SYSTEM

chine work includes hauling away, but does not include track expenses, pumping, or repairs on machinery. These three items are of necessity subject to very great fluctuations, and depend in large measure upon local circumstances. Both excavation figures include cost of placing braces.

PILING AND PRICE OF LABOR

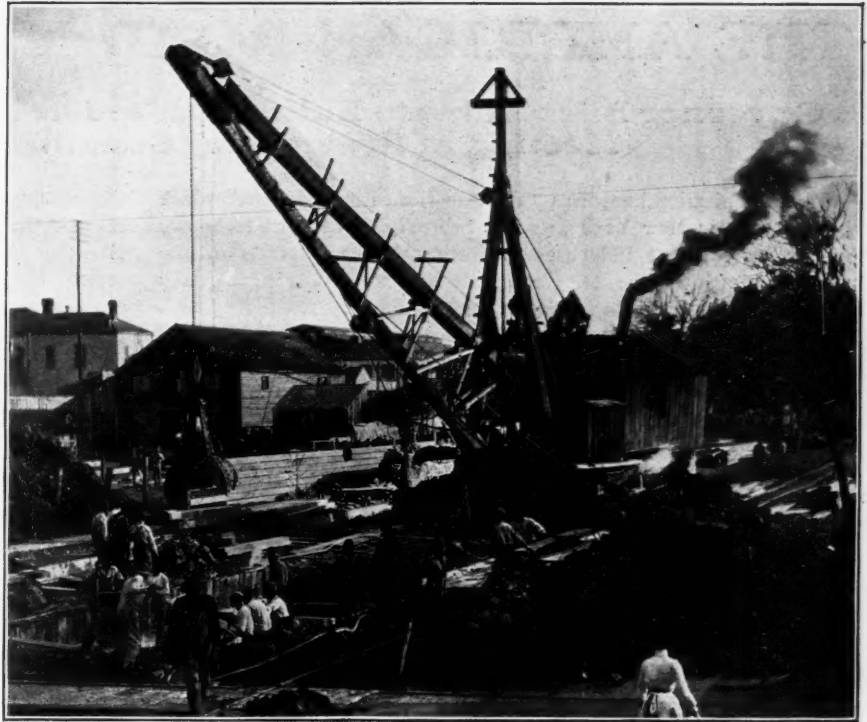
On all work done, sheet piling has been driven in advance of machines by drop hammer pile drivers. On account of the sticky character of the soil, all sheeting has been left in the ground, it having been found to be more expensive to pull it than to buy new lumber. Yellow pine is worth now in the market about \$12 per thousand feet, B.M. f.o.b., New Orleans. Sheet pile driving costs from $\frac{1}{2}$ cent to $1\frac{3}{4}$ cents per lineal foot of sheeting, the sheeting varying in length from ten feet to sixteen feet. Round foundation piles, forty feet long, fourteen-inch butt, cost eight cents per lineal foot, steam hammer.

The brick walls have been built partly by day labor and partly by sub-contract. The average cost of the labor has been \$1.35 per cubic yard. Bricks are worth \$7 to \$9 per thousand, sand is worth \$1 to \$1.25 per pard on the docks, and must be transported long distances, either from Lake Pontchartrain or from Prophet's Island, some sixty miles up the river. A number of cargoes of sand coming from European and South American ports as ballast have been used. Portland cement mortar is used for brick masonry, the proportions being one part of cement to three of sand.

For concrete the commission allows the use of either gravel or lake shells. They are about equal in price, the gravel coming from beds on certain islands in the Mississippi river, the shells from the Lake or Gulf shores. Portland cement is used for concrete also, the proportions being one part of cement, three parts sand, five parts gravel or shells. The canal bottoms are first laid in concrete which is then covered with an inch of cement mortar and given a sidewalk finish. The cost of laying concrete has been about fifty cents a yard.

THE USE OF STEEL

The canal covers which are flat are built of concrete and steel rods. The false work having been placed, a layer of concrete three-fourths of an inch is first laid down. Upon this corrugated steel bars one-half inch square are laid across the canal, the spacing center to center of bars varying from 4 inches for a span of thirteen feet to 10 inches for a span of five feet. The bars are cut fifteen inches longer than the clear span of the canal. After the bars are laid in place the remainder of the concrete is laid down so that the whole mass enclosing the bars sets and hardens simultaneously. The specifications require, 28 days after concrete is laid, a test load



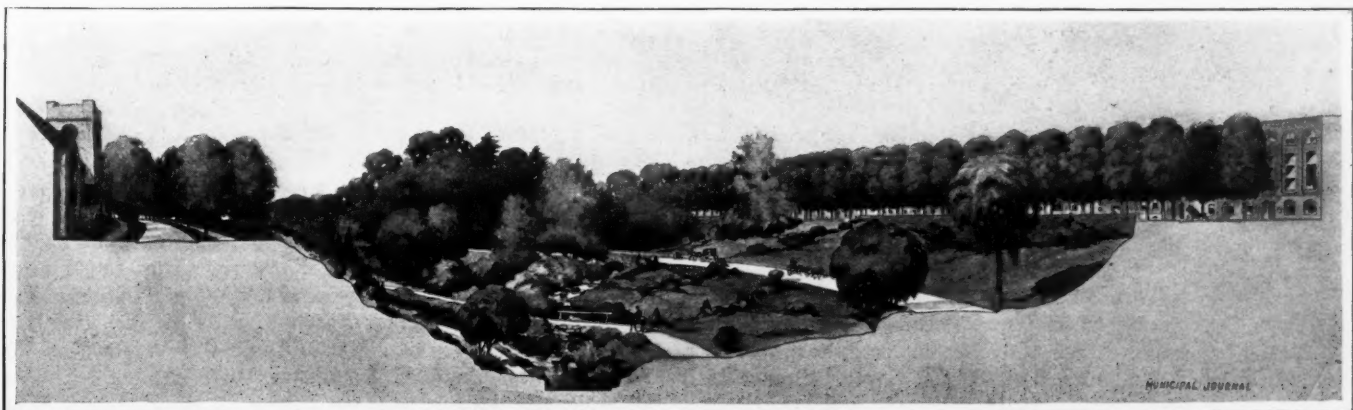
TURNTABLE DERRICK RIGGED TO OPERATE ORANGE PEEL BUCKET

of 10,000 + (the span in feet) 1,200 pounds to be carried on a six inch square block resting in the middle of the span.

The method of making the test has been to apply twice the load on two blocks placed six feet apart. Tests have been made so far on thirteen foot, five foot, and six foot canals. No appreciable deflection could be observed under the specified loading, and no settlements or cracking has been detected. Every indication points to the construction as a reliable covering, much cheaper than arch or I-beam construction; in fact, the cost runs very little above that of ordinary concrete work of the same dimensions. The following thicknesses of concrete are specified:

Space in feet.	Thickness concrete in inches.
5'-0"	5.85
6'-0"	6.58
7'-0"	7.26
8'-0"	7.92
9'-0"	8.59
10'-0"	9.23
12'-0"	10.61
13'-0"	11.23

EDITOR'S NOTE: The foregoing article is reproduced for the benefit of the readers of THE MUNICIPAL JOURNAL, by the courtesy of the editor of the *Transactions* of the Association of Civil Engineers of Cornell University, Mr. M. A. Beltaire, Jr., Ithaca, N. Y., to whom we are indebted also for the use of the illustrations.



CONNECTION BETWEEN ROCK CREEK PARK AND SOLDIERS HOME. (SEE ARTICLE ON WASHINGTON AS A WORK OF CIVIC ART)

THE AMERICAN ROAD MAKERS AT WORK

Governor Bliss Helps to Build Roads—Large Gathering at Saginaw—Next Meeting at Greenville—Constitution of the A. R. M.

THE organization known as "The American Road Makers," which had its birth in New York City last February, is destined to be one of the most potent influences in furthering the interests of the nation. We have the telegraph, telephone, steam railroad, and numerous other facilities for which we have great reason to be proud. Their general utility is not to be questioned for a moment; but there are a few good things in which this country is lacking, the most important one of which is good roads. In England and on the Continent, for many years, the people of those countries have enjoyed the benefits of a magnificent highway system. Splendid roads have been built and maintained at large expense. Although most of the countries own their own railroads and have expended millions of dollars in their construction and maintenance, they have not forgotten that

ting an example which others are following. Its officers are among the best known road builders in the country. Senator Horatio S. Earle, of Michigan, is known everywhere as "The Good Roads Senator." He is an enthusiast and often travels hundreds of miles for the sake of giving an address upon the subject without receiving one penny in return. He asks nothing and will receive nothing for his services in the good roads cause. It is through his efforts that Michigan now has a State Highway Commission, and if she ever has a well organized, well equipped, thoroughly efficient, State Engineer's Department, it will be the result of his energetic labors in this direction.

ANOTHER GOOD ROADS TRAIN

Senator Earle's latest effort in the cause of good roads is the start-



GOOD ROADS MEETING AT SAGINAW, MICH.

1. Governor Bliss Turning First Furrow. 2. Senator Horatio S. Earle. 3. Hon. Martin Dodge

to make their railroads most prosperous they must have good feeders, and the public highways are these feeders. They have been wise enough to expend millions in the construction of macadam highways and millions for their maintenance, when the roads of all the countries are taken in the aggregate.

THE NEED REALIZED

Fortunately for the United States not only the busy man, the manufacturer, the legislature, but the farmer is coming to appreciate the need of better highways. All classes are beginning to learn that poor roads cost money and that good roads save money. Strange as it may seem, the bad roads of the United States cost millions of dollars while the expenditures for betterment of roads is measured by thousands. The American Road Makers are in the van. They are set-

ing of a good roads train over the Pere Marquette Railroad, taking in many counties in Michigan. He expects to build numerous samples of stone, gravel and macadam roads, and to run, as Senator Daniel of Maryland did, "A university on wheels" throughout the State, teaching the farmer how to improve the highway. The work commenced last month at Saginaw, Michigan, when, beside the local celebrities, including the Mayor and other city officials, Senator Earle had present Governor Aaron T. Bliss of Michigan, Director of Public Road Inquiries, Martin Dodge, of Washington, D. C.; State Engineer Frank F. Rogers, of Michigan, and others, all of whom heartily joined in the good roads work. Hundreds of people from that section gathered in the city to witness the first breaking of ground to inaugurate a campaign for good roads in Saginaw

County. Governor Bliss held the plow that turned the first furrow in inaugurating this work. The accompanying illustration shows the Governor in the act. There were addresses made by Governor Bliss, Director Martin Dodge, Senator Earle, and others. It was a gala day for good roads which the people of Saginaw County will long remember, and it begins a work which is certain to be a most potent factor in increasing the prosperity of the county.

THE NEXT CONVENTION

This is but the beginning of a series of meetings to be held under the auspices of the Michigan Highway Commission with Senator Earle as its President. The next good roads convention will be held at Greenville, Mich., July 29 to 31 inclusive. At this point Senator Earle's good roads train will build a sample stone and gravel road and show how to improve a common dirt road. State and Deputy Engineers Bond and Judson of New York, Highway Commissioner Henry I. Budd of New Jersey, Highway Commissioner McDonald of Connecticut, Hon. Martin Dodge of Washington, D. C., Col. W. L. Dickinson, President Connecticut Valley Highway Association of Massachusetts, and other good roads enthusiasts, will be invited to attend this large good roads gathering.

For the benefit of our readers we print the important parts of the Constitution of this society:

"ARTICLE I.—NAME AND OBJECT

"SECTION 1. The name of this organization shall be the 'American Road Makers.'

"SECTION 2. The object of the American Road Makers shall be the promotion of the general betterment of Highways throughout the United States, and the special construction of inter-capital connecting highways converging at the National Capital.

"ARTICLE II.—DIVISIONS

"SECTION 1. The American Road Makers' association for convenience in administration and government shall be sub-divided as follows:

"Into four grand divisions to be known as the Eastern, comprising the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania and Delaware; the Southern, comprising the states of Maryland, Virginia, West Virginia, Kentucky, Tennessee, South Carolina, North Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas and Texas; the Central, comprising the states of Michigan, Ohio, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas; the Western, comprising the states of Montana, Wyoming, Colorado, Idaho, Utah, Washington, Oregon, Nevada and California.

"ARTICLE III.—MEMBERSHIP

"SECTION 1 The Association shall consist of Active and Honorary Members and Associates.

"SECTION 2. Persons engaged in building or improving highways, or in disseminating knowledge of how to build or to improve them, or in advocating the building or improving of public highways, shall be eligible as Active Members.

"SECTION 3. Those who may have distinguished themselves by large gifts of money, or time or talent, or who are actively connected with the United States Office of Road Inquiries, or any department which may succeed it, having like or larger purpose in view, shall be eligible as Honorary Members and shall have all rights of Active Members, except voting and holding office.

"SECTION 4. Persons who are engaged in the manufacture or sale of road-machinery or supplies, are eligible as Associates and shall have all rights of Active Members, except voting and holding office.

"SECTION 5. The Active Membership from each State shall be limited to ten, until the full quota from all the states is filled, when a second ten will be eligible.

"SECTION 6. The Honorary Memberships and Associates shall be unlimited in number.

ARTICLE V.—FEES AND DUES OF MEMBERS

"SECTION 1. The fees and dues shall be as follows:

Active Members, entrance fee, \$5.00; annual dues, \$5.00. Associate Members, entrance fee, \$15.00; annual dues, \$10.00.

"SECTION 2. The fees shall be paid on joining, with pro rata share of the annual dues for the balance of the current year, and the possession of receipt therefor shall be evidence of Membership."

It will be noticed by reference to the Constitution above quoted that the American Road Makers have for their object the construction of the Inter-capital connecting highways. This is a large undertaking,

but one which is not beyond the realm of possibility. With hearty co-operation on the part of the Federal Government, and all the friends of good roads throughout the country, it is not unreasonable to look for its achievement within the next quarter of a century at the longest. The good roads sentiment now prevailing in the United States is something stupendous. Only those who have taken the trouble to keep in touch with this wide spread movement have any adequate idea of how large it is. Many of the good roads enthusiasts are called dreamers, but they are certainly dreaming to some purpose. Those Americans who travel in England and on the Continent of Europe return to the United States with glowing descriptions of the magnificent roads to be found everywhere in those countries. They lament the poor conditions that are to be found in the United States.

Millions of pounds have already been expended in improving the highways of England and they have been brought to a state of perfection which is unknown in this country. We are just waking up to a realizing sense of the need of better highways, and it is safe to predict that by the end of the next twenty-five years there will be a greater mileage of good roads in the United States than is to be found in England and all Europe.



1. HORATIO S. EARLE, PRES'T

2. EDWARD A. BOND, FIRST VICE-PRES'T

3. R. H. THOMPSON, SECOND VICE-PRES'T

4. E. H. VASMER, THIRD VICE-PRES'T

5. W. L. DICKINSON, TREASURER



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NEW YORK, JULY, 1902

Asphalt Trust Beaten in Brooklyn

THE Borough of Brooklyn, last month, advertised for bids for asphalt paving aggregating 118,000 square yards to be laid at a cost of nearly \$300,000. As might be expected, there was considerable competition and there was a warm fight among the contractors to see who should be successful in carrying off so rich a plum. The contract was finally awarded to The Interstate Paving Company of Utica, N. Y., a concern which had never laid any asphalt pavement in Brooklyn, and in fact, which had laid very little pavement prior to two years ago. Representatives of the asphalt trust protested against the granting of the contract to this comparatively new firm on the ground that it would be unable to carry out its part of the contract as its source of asphalt was uncertain.

It was positively stated by those who opposed the successful bidder that there was no mine or supply of asphalt such as the Goleta Mine at More's Landing, Cal., as was represented by the successful company, and that the company was using an old, abandoned bed of asphalt on an olive farm merely to cover its true basis of supplies, which the officers of the trust said lay in a process of distilling petroleum oil, thereby producing a very inferior quality of asphalt, not suitable for street paving. These assertions were made in the office of Borough President Swanstrom. Very naturally they were disquieting to the Borough President and to Commissioner Redfield, who immediately determined to make a thorough investigation.

A public hearing was called on the morning of June 7th, when the President of the Interstate Paving Company made affidavit that the material they proposed to use was not such as it was stated to be in the protests of their opponents. He presented several affidavits, all of which were of the most convincing character. These in themselves were apparently satisfactory, but the civic authorities were unwilling to rest their investigations at this point, and pursued it still further.

"On the 11th of June," said Commissioner Redfield, "the Interstate Paving Company submitted the report of the U. S. Geological Survey and portion of the Department of the Interior for the year 1901, on the asphalt and bituminous rock deposits of the United States. In this, pages 441 and 442, is a detailed description of the asphalt at More's Landing, stating that it occurs under three conditions: one deposit is a massive bed of high grade material; the second is a material of even greater purity than the first, forming veins in the sandstone of the region; the third, of extreme purity and resembling gilsonite in small pockets in the sandstone."

The Borough authorities, in addition to this submitted evidence, deemed it advisable to secure the opinion of a witness on the ground. For this purpose they telegraphed to Mr. James D. Schuyler of Los Angeles, a Director of the American Society of Civil Engineers, requesting him to make a thorough examination promptly, and report in detail by telegraph. On June 12th the following telegram was received from Mr. Schuyler reporting upon the situation:

"More's asphalt mine at Goleta consists of a number of nearly vertical veins of irregular and varying width, from few inches to 20 feet or more protruding from face of cliff over 100 feet high for a mile of sea frontage; the ocean is actively lining the soft sandstone and clay cliffs and masses of asphalt are constantly loosened and can be hauled away at low tide. No continuous artificial mining is needed to supply an ordinary demand. More is a wealthy farmer whose farm hands mine asphalt and put it on wharf at odd times when there is demand. Four men and one team yesterday forenoon mined and delivered to wharf twenty tons. Amount of possible output is apparently dependent merely upon the number of men and amount of machinery employed. Total volume available can only be approximately determined from week of tests and a survey, but it is manifestly large. Three pits, 50 to 60 yards back on top cliff indicate apparent continuity back from coast frontage."

A second telegram was received from Mr. Schuyler on the 12th, which stated: "Further investigation at low tide to-day reveals existence of abundant deposits of asphalt at More's Landing not visible yesterday, and fully confirms first impressions. Mine has been worked over forty years, never abandoned and regularly worked as demands required."

Upon receipt of this unquestioned testimony Commissioner Redfield again announced that the contract for the asphalt paving in Brooklyn had been awarded to the Interstate Paving Company. A representative of the asphalt trust called upon him and asked if he did not think this action was premature. "On the contrary," replied Mr. Redfield, "the action has been taken only after most thorough and careful investigation. We are now sure of our ground; as sure as it is possible to be without being actually at More's Landing, where the Goleta mine is situated."

"I have never questioned the entire good faith and sincerity of the Cranford Company, but I will tell you plainly and frankly, gentlemen, that the way it appears to me is this: Some one under the guise of a half truth has said things and made representations which I am convinced amount to nothing more or less than a deliberate and nasty falsehood."

"They have said that there were no mines now in operation at More's Landing. In the sense that there is no mining shaft and no large plant in operation, they told a half truth. There is no shaft because the Creator so ordered it that it was unnecessary to build a shaft. Gentlemen it has been so ordained that the waves of the mighty ocean daily washes down a supply of the purest and best crude mineral asphalt in the world."

"The statements of the United States Geological Survey are most remarkably and satisfactorily corroborated in every particular by the direct reports of a competent and disinterested engineer, Mr. Schuyler. It is in this belief that we have awarded the contract to the company which has the use of these mines."

Gas Leakage Problem

WITHIN the past few months a great deal of attention has been directed to the study of gas leakage as a problem of large importance in cities. Somewhat tardily, it would seem, the fire underwriters have awakened to the fact that the circular on the fire risk of gas leakage under impervious pavements, issued more than a year ago by the National Board, was of vast and immediate significance, and that its study is a duty of first importance for those devoted to insurance engineering. The County Medical Association, in beginning the investigation of this subject with a view to estimating its influences upon the public health, have awakened a professional and popular interest in it which promises to be attended with important benefits. The Committee on Hygiene of that body have been making some clinical investigations which point to an intimate connection between the leakage of carbon monoxide into

living and sleeping rooms and the prevalence in cities of low fevers resembling those attributed to malaria, but not yielding to other treatment than the removal of the patient to another environment. Chemical tests have established in the dwelling of such persons the presence of illuminating gas in dangerous quantities in the in-odorous form in which gas filtered through the soil is commonly found in buildings to which main leakage has access.

The New York Health Department has recently manifested a lively interest in this subject, and as a result of the investigations of the County Medical Association, has made arrangements to inspect much more critically and exactly than was formerly considered necessary complaints of citizens of annoyance from gas. The plan hitherto followed has been to send to the premises complained of, an inspector who undertook the duty in the usually perfunctory way by nosing around and, if he smelled gas, so reporting; whereas if he did not smell it he so reported and advised that the complaint be dismissed. The valuelessness of this method of finding gas is probably better known to the gas engineers than to any one else. Water gas has only the odor imparted to it by the hydrocarbon enrichments which make it luminous. These are filtered out in passing through the soil, and the gas which remains, having approximately the composition of uncarburetted water gas, (H_2 , 45 parts, CO 45 parts; CO_2 5.5 parts; N_2 parts; CH_4 2 parts and O_2 .5 parts) is wholly odorless but as dangerous as any gas could very well be. Even gas which carries its proper proportion of olefiant, as in the case of that which leaks from pipes and fixtures in houses, when present in air in dangerous quantities, is detected when present in small percentages only by a nose abnormally sensitive. Employees of gas companies cannot smell gas in an explosive mixture of gas and air, and when they bar for main leaks usually have to depend upon a match to tell them whether any gas has been found. Sanitary inspectors quickly become immune to gas in small quantities, and when they find it the quantity present in the air may safely be assumed to be well within the explosive range of seven to thirty per cent. The Health Department is now using better methods. The Bureau of Buildings is also giving this subject attention from the fire and health viewpoints, and has made some surprising and startling discoveries in New York theatres and other places of public assembly with which it has begun. In these tests a very efficient apparatus, first employed in the clinical researches of the County Medical Association, is being used, which by means of a strip of paper sensitized by a reagent which is discolored by gas when present in air in proportions as low as one or two one-hundredths of one per cent., gives a record which the inspector can turn in with his report, and which is infallible. The same method is being used in Chicago to test the gas percentage in the air of sewers—a matter of unusual local interest since the disastrous and fatal explosion and conflagration in that city,—and it was brought up and discussed with unusual interest at the National Convention of Master Plumbers at Atlantic City a few days ago, on the initiative of Mr. P. M. Stewart, Superintendent of Buildings of New York. Next fall, when the conditions are restored which give the subject an interest which it cannot possibly have during the summer months, when even dangerous gas leakages are rendered comparatively harmless by the rough but effective ventilation of open doors and windows, it promises to be investigated in a way which will give the gas engineers much uneasiness.

It would be difficult to exaggerate the importance of gas leakage from mains and service pipes as a municipal problem. The fire hazard to which it gives rise has been pronounced by the National Board of Fire Underwriters as accounting for a large proportion of the "mysterious" fires in New York and other cities. Recent investigations, confirmed by the researches of Dr. Thomas Oliver, Medical Expert of the British Home Office, concerning carbon monoxide, warrant the belief that it is the cause of a great deal of the *anæmia* which prevails in cities, and accounts for no small proportion of the death rate among those exposed to its influence. It destroys asphalt pavements, by dissolving the binder and permitting the surface to break down under the traffic, as well as by necessitating the frequent opening of streets to discover and repair main leaks and fractures. It adds from ten to twenty per cent. to the cost of gas to meter consumers, as well as that burned in

street lighting, since even in what is considered good gas practice from ten to twenty per cent. of the gas charged into holders is lost in distribution. It adds a constant element of danger to work in sewers, subways and street excavations, giving frequent and costly explosions which are highly destructive of public property, as well as of life. It is a constantly increasing evil, as the vast mileage of gas mains in use are steadily growing older and more defective and the difficulties and costs of main repairs and replacements are steadily becoming greater as better and more expensive street pavements have to be cut and replaced. This encourages on the part of gas companies the neglect of all but extraordinary leaks which become conspicuous as public nuisances and are made the subject of complaints sufficiently formal to create a criminal responsibility if not attended to.

The subject is much too large for exhaustive editorial discussion. We are advised that it will be taken up for formal consideration at the next meeting of the League of American Municipalities, and in view of the interest of the subject those in the membership in position to contribute facts of value from local experience should avail themselves of the opportunity of doing so. Considering its importance, it is undoubtedly the least understood and hitherto most neglected of municipal problems.

The Next League Meeting

THE Sixth Annual Convention of the League of American Municipalities will be held in Grand Rapids, Mich., August 27, 28, and 29. The programme includes addresses by Jacob A. Cantor, President Manhattan Borough; Samuel M. Jones, Mayor, Toledo, Ohio; J. M. Head, Mayor, Nashville; T. G. Hayes, Mayor, Baltimore; W. B. Doyle, Mayor, Akron, O.; W. D. Lightall, Mayor, Westmount, Canada; W. N. Drennan, Mayor, Birmingham, Ala., and several other city officials. The topics for discussion comprehensively cover the municipal subject, and form the most attractive programme the League has ever had.

Mayor W. Millard Palmer of Grand Rapids, is co-operating with Secretary McVicar to make this the largest gathering of municipal officials this country has ever known. Elaborate preparations are now going on for entertainment, while the Secretary is making every effort to secure a large attendance. Excursion trains will be run from the West, East and South provided the Secretary receives sufficient encouragement from city officials in different localities to warrant such an undertaking. The Secretary would be glad to be informed immediately of all who intend to attend the Grand Rapids meeting.

A large convention hall, with ample space on the same floor where the sessions of the convention will be held, has been provided for the use of manufacturers and supply men. It is the desire of Grand Rapids and the Secretary to make this feature most attractive and valuable. It is hoped to have a large representation from the numerous manufacturers and supply people who cater to the municipal trade.

These annual gatherings of city officials present opportunities for obtaining practical information about the conduct of municipal affairs that are not to be found elsewhere. The interchange of ideas, the discussion of civic problems, and the narration of actual experience, at these gatherings are invaluable to the wide-awake and earnest city official. We hope that those of our readers who are not members of this League will apply to Secretary McVicar at once for membership blanks, and commence preparations for attending this meeting. The expense entailed in sending a representative delegation from cities is not large and, if the right persons are selected, it is not unreasonable to expect that many times the amount of the membership fee and the expenditure incident to the journey will be realized in the better conduct of city affairs as a result of the experience gained. Address Secretary MacVicar, Des Moines, Iowa, for full particulars concerning this meeting. We shall give the complete programme and other interesting details in our August issue.

The fall of elevators is not an infrequent occurrence in New York and other cities. The numerous injuries and deaths incident thereto, furnish sufficient reason for an ordinance in every city calling for the installation of the safety air-cushion. This contrivance is in use in various cities and has proven itself most efficient.

EDITORIAL COMMENT

You appreciate the value of the *MUNICIPAL JOURNAL AND ENGINEER*. Why not introduce it to some of your friends? Get them to send one dollar for a six months' trial subscription.

Begin at once to make your preparations for attending the next meeting of the League of American Municipalities at Grand Rapids the latter part of August. Address Secretary MacVicar, Des Moines, Iowa, for full particulars.

The cheapest pavement is not always the best pavement, and it is not wise to force the price of modern pavements, whether they be asphalt, wood, bituminous macadam, brick, or stone, to the lowest figures. A fair price should be allowed, and it is sure to make a better pavement and be more economical in the long run.

Following the example of Greater New York, Columbus, O., is endeavoring to secure proper street signs to show the names of the different thoroughfares of that city. Most of the cities of the United States are in need of the same reform, for street signs are lacking in most of them.

It is gratifying to note that the crusade against the bill board nuisance is making some headway in Buffalo, N. Y. Recently a fine of \$25 was imposed upon an offender by a local ordinance in that city. This should go a long way toward convincing the general public that a law to prevent the building of objectionable bill boards is capable of enforcement.

The taking of human life by the fenderless car has almost come to be a matter of daily occurrence in Greater New York. While some of the lines are properly fitted with a modern and effective fender others are allowed to go without any protection for human life. In front of our building one day last month, on the Broadway line, a woman was knocked down by a fenderless car, and pulled out just in time to save her life, by a policeman. The fatalities taken in the aggregate throughout the cities of the country, form a total which is appalling. Is it not time that city officials took some vigorous action to prevent the continuation of this useless sacrifice of human life?

There is an inclination on the part of some cities to practice false economy by using the public telephone system or an independent telephone system for the purpose of sending in its fire alarms to fire headquarters. That this is an unsafe, not to say a foolish plan, is to put the matter lightly. It is a notorious fact that even with the best regulated telephone system it often occurs that from five to twenty minutes are consumed in securing a connection with the party to be conversed with. Everything depends upon the immediate delivery of an alarm of fire to the fire department. If this is delayed even five minutes it is likely to prove disastrous. It has been demonstrated time and again that the only reliable method of transmitting an alarm of fire is over the lines of an independent, regularly installed fire alarm system. Any substitute for this system is sure to bring a calamity upon the city using it sooner or later. Fire commissioners cannot be too particular in keeping their fire alarm telegraphic system up to date.

While the movement of the independent telephone companies throughout the country has reached enormous proportions yet there is need for greater improvement, particularly among Eastern cities. Nowhere is this need more keenly felt than in the Atlantic Coast Line States and particularly in New York. American cities have much to learn from foreign municipalities. For instance, Stockholm may be said to be the paradise of telephones, both from the point of view of the companies and the public. In our plea for cheaper telephone rates we do not mean to lessen the opportunities of the corporations for making money, but in reality to improve them, at the same time benefitting the general public. For this reason the figures given in the latest Consular Report relative to this subject in foreign

fields are a living testimony to the value of enterprise in the management of the telephone question, and the long-suffering business men of this country must cast envious eyes at their brethren in Sweden who are fortunate enough to live under an enlightened telephone administration. Telephones in the Swedish capital are both good and cheap. The best known private company charges less than \$15 to put up the apparatus and less than \$5 per quarter afterwards for an unlimited service. In 1883 this company commenced with 60 employees and 1,160 subscribers; in 1901 the figures were respectively 688 and 29,801. These figures are eloquent, but to show what cheap telephones, combined with efficient management have done in Sweden as compared with other cities, it is interesting to note that while London with an approximate population of 4,000,000 has 20,000 telephones, Stockholm with a population of 362,000 has 29,000 telephones in use.

A Correction

BINGHAMPTON, N. Y., June 8, 1902.

Editor, *MUNICIPAL JOURNAL AND ENGINEER*:

In your issue for June speaking of telephones you place the rate in our city at \$60.30 for business and \$24.15 for residence telephones. As I know you wish to be as nearly accurate as possible I send you the correct rates, which are \$30 for business and \$15 for residence. There are two lines in operation in our city, one under the Bell Telephone management and the other under an independent management.

H. H. WOODBURN, *Alderman*.

Brick Pavement on Clay Subgrade

ORRVILLE, O., May 28, 1902.

Editor, *MUNICIPAL JOURNAL AND ENGINEER*:

It is the intention to pave one of our residence streets this summer and it has been suggested by some that on account of the light traffic that will go over the pavement and the nature of the soil that we could depart from the usual plans of street paving and dispense with the excavating and filling with slag or gravel. The soil is a yellow clay that when dry is very hard and it is proposed to excavate six inches below the top of what the grade will be when the paving is completed, pack the clay as solid as it can be done with a steam roller, put on two inches of sand for the cushion and lay the brick blocks on the sand. After the brick have been rammed, cement the pavement with the best of cement. We would place tile on each side of the street, so as to prevent any seepage and it seems to us that such a pavement would be all right, but we would like to have your opinion on the proposition. We think that the clay can be rolled as solid as either slag or gravel can be made and if the clay is kept dry by cementing the top and draining the sides it will always stay hard. If you are not in a position to give us an opinion, we would be glad to pay for the opinion of an expert. We would also like to know if you have any knowledge of streets being paved as we have above suggested.

D. F. GRIFFITH, *Councilman*.

It is not likely that this arrangement would give you good results. A clay subgrade is the most difficult material upon which to lay a good pavement of any kind. The success of your proposed arrangement would depend upon keeping the clay perfectly dry and this would be difficult. A very small amount of water leaking through the brick pavement, as it certainly would do at some point, would soften the clay and result in depression of the pavement.

If the clay subgrade is already dry and hard, it is doubtful if your roller would produce any effect upon it, and if it is not dry, the effect of rolling would be to make waves in the clay which would increase and become worse with additional rolling.

The usual plan of laying a brick pavement is to cover such a subgrade with 4 inches or 6 inches of concrete; and for you to dispense with the usual concrete and also to dispense with the layer of slag or gravel which you have generally used would be unwise. The saving which you would make by dispensing with the slag or gravel would be small compared with the dissatisfaction and loss which would result if your pavement proved a failure as it probably would do.—
[EDITOR.]

Personalities

—Mr. William Danforth was elected City Engineer of Red Wing, Minn.

—The City Council of De Land, Fla., elected Mr. R. D. McDonald to the office of City Engineer.

—Mr. S. L. Rose has been re-elected as Superintendent of the Public Schools of Hamilton, O. His salary is \$2,500 a year.

—Mrs. Abbey R. Smith has given \$50,000 to the Board of Control of Scranton, Pa., to be used in erecting a manual training school which the city has long desired.

—City Engineer H. C. Thompson of Bay City, Mich., has had his salary raised to \$1,200 a year and in the future will have charge of the water works for which he will receive \$300 additional.

—The municipal elections at Tampa, Fla., resulted in a victory for the reform movement represented by the Good Government Club. Captain James McKay was elected Mayor by a large majority.

—Mayor Joseph Boschert of La Crosse, Wis., and also President of the La Crosse and Eastern Railway Company, was recently attacked by a dozen women while he was with surveyors who were at work laying out the proposed road. Property owners had protested strongly against the building of the road.

—In his annual report, Mayor Smith of St. Paul, Minn., recommended that bonds be issued for many public improvements such as sewers, schools, bridges, engine houses, fire apparatus and a police station. He also urged that \$100,000 be expended in carrying out the contemplated improvements in the parks.

—The City of Winchester recently received a severe shock when the result of the election showed the defeat of Mayor R. T. Barton, for re-election. Mayor Barton had held the office of Mayor for many years as a Democrat, but at last met his Waterloo at the hands of Mr. W. C. Graichen, a wealthy silk manufacturer who ran on the Republican ticket.

—The Commissioners of Water Works of Erie, Pa., have lost their efficient secretary and treasurer in the death of Mr. William Himrod who died on May 30th, at the age of sixty-one years.

—At a recent election in Portland, Ore., Mr. George H. Williams was elected Mayor on the Republican ticket by over 1,000 plurality. The new charter was adopted.

—Councilman John McFarland of Indianapolis, Ind., recently urged that the Council have the consumers of natural gas vote whether or not they would have meters for the gas. He suggests that, when they paid their monthly bills, they express their choice.

—Councilman Frederick W. Gnichtel of Trenton, N. J., delivered an address on "Municipal Government" before the members of the Trenton Council of the National Union.

—The death of Mr. Peter Milne, Secretary of the American Water Works Association, occurred at his home in Brooklyn, N. Y., on June 9th. Mr. Milne served as water purveyor under Mayors Low, Schieren and Wurster and was Chief Engineer of the Department of City Works under Commissioner T. B. Willis. At the time of his death, Mr. Milne was practicing as a consulting hydraulic engineer and was sixty-five years of age.

—President Wilcox of the Park Board of New York, N. Y., has been working hard to prevent injury to the city's trees from uses to which they have been put by contractors working on the subway. It has been the practice of these men to attach guy-ropes, hitch horses to, and pile refuse about the trees contrary to the ordinances of the Board. It was necessary for the President to have one of the contractors arrested before he could impress on them all that he meant business.

—After a sensational inquiry into some recent actions of Mayor A. A. Ames of Minneapolis, Minn., the grand jury of Hennepin county indicted him for "offering a bribe for appointing to public office." The members of the jury were all personally acquainted with the Mayor and some of them were personal friends of his. It was charged that the Mayor tried to bribe County Commissioners into electing his private secretary to succeed Sheriff Megaarden. Mayor Ames, contrary to expectations, did not resign his office, which he has held for four terms, although he did give up the presidency of the Board of Charities and Corrections.

—At the annual meeting of the State Association of the Mayors of Texas held at Corsicana the last of May, an interesting and instructive program was carried out. Mayor Call delivered the address of welcome and Mayor Cabell of Dallas responded. Mayor Riggins of Waco discussed "What proportion of the cost of street paving should be borne by property owners." He concluded that one-third should be assessed on the owners on either side of the street. Mayor Cabell also spoke on this subject. Mayor Ward of Georgetown offered a resolution that was unanimously adopted, calling for a constitutional amendment authorizing councils to submit the question of cross-walks to property owners and, if adopted, to construct the walks if the citizens fail to do so and charge the cost as a lien against the property on the street. Marlin was chosen as the next place of meeting and the following officers were elected for the ensuing year: Mayor Lewis of Ennis, president; Mayor Roberts of Abilene, first vice president; Mayor Shelton of Marlin, second vice president; Mayor Chapman of Greenville, secretary; Mayor Shaw of Kaufman, treasurer.

Convention Dates

JULY

The association of the mayors of Georgia will hold its convention at Atlanta in the latter part of July. Mayor Livingston Mims, Atlanta.

AUGUST

The tournament of the Illinois Firemen's Association will be held at Blue Island, Ill., August 5-7. Walter E. Price, Champaign, Ill.

The American Park and Outdoor Association will hold its sixth annual meeting at Boston, Mass., August 5-7. Warren H. Manning, secretary, 1101-4 Tremont Bldg., Boston.

The Connecticut State Firemen's Association will hold its nineteenth convention at West Haven, Conn., August 12-13. John S. Jones, secretary, Westport, Conn.

The Thirteenth annual convention of New York State Firemen will convene at Hudson, N. Y., August 18-22. Henry Buxbury, secretary, Hudson.

The sixteenth annual convention and celebration of the Virginia State Firemen's Association will be held at Portsmouth, Va., August 20-22. G. C. Cummings, secretary, Portsmouth.

The League of American Municipalities will hold the annual convention at Grand Rapids, Mich., August 27-29. Hon. John MacVicar, Secretary, Des Moines, Iowa.

SEPTEMBER

The convention and tournament of the Iowa State Firemen's Association will be held at Davenport, Ia., September 1-4. H. Horan, secretary, Muscatine, Ia.

The fifth convention of the National Firemen's Association meets at Detroit, Mich., September 11-12. D. W. Gillen, secretary, 176 E. Monroe street, Chicago, Ill.

The Association of Chiefs of Police of the Pacific Slope will meet at Portland, Ore., September 16. Chief Hodgkins, Oakland, Cal.

The International Association of Fire Engineers will hold its convention at New York City on September 16-19. Henry A. Hill, secretary, Wyoming O.

OCTOBER

The International Association of Municipal Electricians holds its seventh convention at Richmond, Va., October 7-9. F. P. Foster, secretary, Corning, N. Y.

The twenty-third convention of the Pennsylvania State Firemen's Association meets at Bradford, Pa., October 7-10. W. W. Wunder, secretary, Reading, Pa.

The annual convention of the American Society of Municipal Improvement will be held on October 7-10 at Rochester, N. Y. E. A. Fisher, president, Rochester, N. Y.

The American Street Railway Association will meet at Detroit, Mich., October 8-10. T. C. Penington, 2020 State street, Chicago, Ill.

DECEMBER

The thirtieth annual meeting of the American Health Association will be held at New Orleans, La., December 8-12. Dr. Chas. O. Probst, secretary, Columbus, O.

NEWS AND PRACTICE AMONG THE CITIES

To Stop Waste of Water—Meeting of Connecticut Mayors—Voting Machines for New York—Telephone Franchise in Woonsocket—Per Capita Cost of Schools—Motor Street Cleaning Machine

SPRINGFIELD'S GOLDEN JUBILEE.—Springfield, Mass., has just celebrated her fiftieth anniversary of the municipality. Three days were given over to the celebration which included speechmaking by prominent men of the city and elsewhere, municipal festival, military and civic parades, concerts, fireworks and every manifestation of joy at the city's golden jubilee.

WATER METERS FOR LONDON.—The County Common Council of London, England, has given its opinion that water should be supplied by meter at a price not to exceed 12 cents per 1,000 gallons and it will endeavor to have this clause inserted in the Water Bill that has been before Parliament for a long time. While some opposition was manifested against this action, a large majority voted for it.

METER RATES IN COLUMBUS LEGAL.—The system of meter rates that Director Immel of the Department of Public Improvements of Columbus, O., recently instituted for the sale of water to citizens has been sustained by the courts of the State. Under the statutes water must be furnished at equal rates or uniform as nearly as can be measured by the 1,000 gallons for the purpose of "paying the expenses of conducting and managing the water works" and a surplus may be created to repair and extend the system.

PURER WATER SUPPLY FOR CHESTER.—The citizens of Chester, Pa., who have been endeavoring to compel the water company to supply purer water to the city, have won their case. A mass of testimony was submitted to the court showing that the water supplied was not fit for consumption and they asked that the company be compelled to install a filtration plant. The Court found that the water was not reasonably pure and that some steps must be taken to give a permanent supply of pure water.

MOTOR STREET CLEANING MACHINE.—One of the boroughs of London, England, has had a motor street-cleaning machine in operation for some time and the satisfaction that it afforded has resulted in the ordering of another one. The machine is used as a watering cart by day and a street-cleaner by night. It is calculated that each motor cart will do more than three one-horse watering carts. The two machines will cost about \$2,500 a year to operate compared with over \$6,500 which is the annual cost of nine horses and men.

TO STOP WASTE OF WATER.—The great waste of water that has been worrying the water department in Kansas City, Mo., is in a great measure, due to the practice of allowing the hose to play on lawns or walks in violation of the rule that at all times the hose must be held in the hand. The department has issued notices stating that the water would be turned off in all cases where the inspectors found the water wasted and could not be turned on again until a fine had been paid. This rule will apply whether or not the violation was the result of a child's or servant's ignorance.

FIRST PUBLIC LIBRARY IN AMERICA.—What is probably the first public library in the United States was started in Charleston, S. C., in 1749. In 1698 the state assembly appropriated money for the purchase of books and the Lords proprietors supplemented the appropriation later. It was in 1749, however, that the officers of a library society were elected and the membership soon increased to 160. At the time of the Revolution there were about 607,000 books besides pamphlets, etc., but all but about 200 were destroyed by fire in 1778. Books were collected again and in 1836 the library moved to its present location.

CITY TO OWN LIGHT PLANTS.—The city of Norwich, Conn., at a recent election, gave a strong vote for municipal ownership of the gas and electric light plants. The affirmative vote for city ownership of these public utilities was more than that cast for any candidate including the mayor and he ran considerably ahead of his ticket. Norwich is the first city in the State to test the law which requires that, whenever a city desires to assume municipal ownership of lighting plants it must first buy out the private gas and electric lighting companies, paying a fair market value for the stock. Mayor Charles F. Thayer was re-elected.

SPEED LIMIT FOR AUTOMOBILES.—The city council of Columbus, O., has passed an ordinance fixing the limit of speed which automobiles may attain within the confines of the city. The machines shall be allowed to run at the rate of eight miles an hour within the central district and fourteen miles outside that district. Every machine shall be equipped with an alarm gong or whistle and carry a light after dark. Violations of the provisions of the ordinance as to speed is punishable by a fine of from \$5 to \$50 or imprisonment for thirty days or both, and for the failure to show a light or sound an alarm a fine of \$50 may be imposed.

OWENSBORO TO HAVE WATER WORKS.—The Court of Appeals of Kentucky, affirming the judgment of the lower court, sustains the validity of the bonds of the city of Owensboro voted for the erection of water works. The City Clerk had refused to sign the bonds—in order to test their validity—on the ground that the election was illegal, and that the city did not have a population of 15,050 as alleged. Both lower and higher courts adjudged that the bonds were legal and that the Clerk must sign them. The bonds will be sold at once at a premium of over \$10,000 according to acting Mayor Delker. They were for \$200,000.

RAILROAD PAYS FOR FRANCHISE.—For the right to tunnel under the Manhattan side of the North River into New York City the Pennsylvania Railroad will pay a nominal rental of \$100 in recognition of the right of the Rapid Transit Commission to exercise jurisdiction over routes under the river which may be hereafter planned. For the privilege of laying tracks under the streets of the city will pay 50 cents a foot a year for the first ten years and \$1 a foot for the next fifteen years. According to the present plans the city is to receive per year for the first ten years \$75,535, and \$114,871 for the next fifteen, or \$2,478,415 for the twenty-five years of the franchise. The terms are then to be readjusted for the franchise is perpetual.

MUNICIPAL OWNERSHIP IN GERMANY.—Municipal ownership is the order of the day in Dusseldorf, Germany. This city is a model city on the beautiful Rhine river and the authorities are always on the alert to look after the well-being of the citizens. There is an electric street railway system that is most satisfactory, for cheap fares and good service are given. The city owns large water, gas and electric light and power works. The harbor is under municipal control. There are excellent schools, parks, clean streets, a municipal theatre and an art gallery. This summer an exhibit of German national art will be held there, showing what the dwellers of the Rhine country can do.

COST OF TRACTION.—An Indiana engineer recently estimated that the cost of moving one ton per mile by horse power over a dry, sandy road was 64 cents; over wet sand 32 cents; over ruts and mud 39 cents; over broken stone and ruts 26 cents; over an earth road that is dry and hard 18 cents; over a broken stone road in good condition 8 cents; over a compact gravel stone 8.8 cents; over stone

paving 5.33 cents; over asphalt 2.7 cents. If wagon transportation could be carried on at a cost of 5 cents per mile per ton the result would be a saving of many millions of dollars and would put in motion many millions of tons of merchandise that cannot now be handled at a profit.—*Midland Municipalities.*

VOTING MACHINES FOR NEW YORK.—The Board of Estimate and Apportionment of Greater New York has been asked to appropriate money for voting machines to be used at the election in the fall. About \$150,000 would pay for all the machines that could be put up in time for this election. At the last election a machine was used in one of the election districts of the Borough of Brooklyn and gave the greatest satisfaction in every way, the rapidity with which votes could be cast and the fact that the result was known in a few moments after the polls closed being some of the greatest advantages. It is estimated that enough could be saved over the ordinary methods of conducting the election to pay for the machines in three years.

A THRIFTY CALIFORNIA TOWN.—The town of Emeryville, Cal., is small but has shown a degree of thrift that is worthy of a large city. There are many public improvements, such as arc lights, water hydrants, good sidewalks and sewers. The last were constructed at the expense of the property owners and the main streets are to be paved on the district plan. The town has no bonded debt and the low taxes have attracted many industries, which are increasing its revenues. The revenue from taxes amounts to \$3,300 per year, saloons yield \$3,000 at \$30 each. The town officers receive fair salaries, the Marshall receiving \$87.50 a month and the Clerk \$75. A town hall is to be built at a cost of \$7,000 and this will be met by the savings from a tax levy of 50 cents on \$100.

TRACK ELEVATION IN CAMDEN.—The city of Camden, N. J., recently passed an ordinance authorizing a contract with two railroad companies relative to the abolition of certain crossings in the city and the elevation of the tracks of the roads. The railroads are to elevate the tracks and provide passageways under them for pedestrians and vehicles. The city is to vacate certain streets and cut new and parallel ones and whenever the city shall desire to cut a street across the tracks of the railroads, a bridge or passage shall be constructed either above or below the grade and the parties to the agreement shall pay each one-half the expenses. The city agrees to save the railroads harmless from all damages that may arise from change of grade.

BIRMINGHAM TO HAVE FILTERED WATER.—The water company that supplies the city of Birmingham, Ala., has acceded to the demands of the city for a purer water supply and will install two filtration plants. Under pressure from the city authorities the company employed two experts to examine the supply and they have reported that, in the main, the water supply was pure, but it may be accidentally polluted. They recommend that steps be taken to stop the enormous waste of water which is entirely unnecessary, the consumption per capita per day being 220 gallons or 100 gallons more than the average American city. They advise that the water from one source be filtered and that from the other be aerated and that one reservoir be used for sedimentation and that when the water is turbid it be treated with a coagulant.

TELEPHONE FRANCHISE IN WOONSOCKET.—An ordinance has been passed in the city of Woonsocket, R. I., granting to the Providence Telephone Company the right to construct and maintain underground conduits for telephone wires. The Board of Aldermen of the city is to have control and direct the placing of these conduits and wires. All conduits, subways, etc., shall be constructed and kept in repair in such a manner as to cause the least possible injury and delay to the public, and as soon as possible after the construction is completed the company shall, at its own cost, replace the streets or sidewalks with the same material with which the adjoining portions of such streets or sidewalks are constructed, and the company shall also keep all such portions of streets or sidewalks in good condition for twelve months from the time of re-

placing the same. The Providence Telephone Company shall furnish and maintain in the conduits suitable and sufficient wires, not exceeding six pairs of wires in any one street for the fire alarm and police signal service of said city, but these wires shall not be used for any other purpose than that specified.

CONNECTICUT MAYORS MEET.—The annual meeting of the Mayors' Association of Connecticut was held at Stamford on June 10. Twenty members were present. Many of the members sent regrets. The officers elected for the coming year were: President, ex-Mayor Harbison of Hartford; vice-president, Homer S. Cummings of Stamford; secretary-treasurer, Mayor J. M. Coburn of South Norwalk; executive committee, ex-Mayor Hugh Sterling of Bridgeport, Samuel Bassett of New Britain and M. W. Dart of New London. Resolutions were adopted calling on the voters of the State to reject the constitution that was about to be submitted to them because it was inferior to the one then existing. The resolutions declared the proposed instrument inadequate for the present and future needs, the amendments in regard to future amendments would annul the present bill of rights and prevent any changes of representation hereafter except by the consent of a small minority. Later reports state that the cities of the State voted down the new constitution by a vote of two to one. The opposition was mainly on account of the representation in the General Assembly. The cities had fought for a larger representation, but the small towns would not concede this. Many in the small towns voted against it because they thought that the larger cities had gained too much by it.

RESULT OF TAX FIGHT IN OMAHA.—The city council of Omaha, in obedience to the mandate of the supreme court of Nebraska, reconvened as a board of equalization and raised the assessments of the public service corporations so as to include the value of the franchises. The increase made on the five companies amounted to \$1,523,190, and as the tax rate is thirty mills the added revenue for the city will amount to \$45,695.70. The following table shows the assessments of the several companies as fixed before and after the mandamus proceedings:

	Before.	After.
Omaha Street Railway Co.....	\$550,000	\$1,300,000
Omaha Water Co.....	575,00	850,000
Omaha Gas Co.....	400,000	775,000
Omaha T-H. Electric L't Co.....	117,500	175,000
Nebraska Telephone Co.....	109,310	175,000

These valuations are supposed to represent 40 per cent. of the actual value of the properties, that being the basis for all assessments in Omaha.

PER CAPITA COST OF SCHOOLS.—While several methods of computing the per capita cost of schools are used, that of the National commission of education is the most comprehensive. The total cost of the schools is divided by the average daily attendance. Figured on this basis, the following cities are given the figures shown by Superintendent Heilman of Dayton, O.

Akron, O.	\$28.10	Milwaukee, Wis.	32.80
Albany, N. Y.	27.46	Newark, N. J.	34.17
Allegheny, Pa.	58.40	New Haven, Conn.	27.80
Boston, Mass.	46.20	Omaha, Neb.	40.55
Buffalo, N. Y.	34.40	Paterson, N. J.	29.00
Cambridge, Mass.	52.30	Pawtucket, R. I.	50.90
Cedar Rapids, Ia.	26.80	Peoria, Ill.	34.40
Chicago, Ill.	35.40	Philadelphia, Pa.	40.20
Cincinnati, O.	26.80	Pittsburgh, Pa.	59.90
Cleveland, O.	34.30	Reading, Pa.	32.50
Columbus, O.	33.80	Rochester, N. Y.	35.60
Dayton, O.	30.70	St. Joseph, Mo.	33.32
Denver, Colo.	45.20	St. Louis, Mo.	33.55
Detroit, Mich.	36.63	San Francisco, Cal.	39.30
Elgin, Ill.	32.60	Scranton, Pa.	40.20
Erie, Pa.	37.90	Somerville, Mass.	36.80
Evansville, Ind.	28.90	Springfield, Ill.	26.10
Fall River, Mass.	26.40	Springfield, Mass.	76.30
Ft. Wayne, Ind.	25.60	Springfield, O.	21.90
Grand Rapids, Mich.	24.70	Syracuse, N. Y.	26.20
Harrisburg, Pa.	27.50	Superior, Wis.	40.10
Hartford, Conn.	53.60	Terre Haute, Ind.	27.40
Indianapolis, Ind.	35.10	Toledo, O.	26.30
Jersey City, N. J.	33.35	Utica, N. Y.	38.10
Kansas City, Mo.	48.14	Providence, R. I.	40.60
LaCrosse, Wis.	30.40	Washington, D. C.	34.60
Lawrence, Mass.	47.90	Worcester, Mass.	41.86
Los Angeles, Cal.	29.70	Wilkesbarre, Pa.	32.30
Lowell, Mass.	35.00	Yonkers, N. Y.	50.90
Lynn, Mass.	27.70	Youngstown, O.	28.10

Telephone Statistics

	Do railways pay for street sprinkling?	No. telephone companies.	Rates per year.		Telephone com- pany paid for franchise.	Wires under- ground in busi- ness districts?	Telephone com- pany gives for franchise.
			Bus.	Res.			
Akron, O.....	T	2	\$36	v\$14	Nt	Y*	Fp†
Atlanta, Ga.....	N	2	25-75	25-75	Nt	Y	Fp†
Buffalo, N. Y.....	N	1	v 75	v 36	Nt†	Y	Nt
Butte, Mont.....	N	1	54-80	12-30	Nt	N	Nt
Davenport, Ia....	N§	2	48; 30	30; 18	||	Nt	p.c.
Dayton, O.....	Nt	1	....	....	Nt	Y	Fp
Harrisburg, Pa....	T	2	39; 36	24; 21	\$	Nt	Fp, p.c.
Haverhill, Mass....	Nt	2	v 36	v 24	Nt	Y	+
Kansas City, Mo....	Nt	1	96	60	Nt	Y	Fp
Malden, Mass.....	N	1	....	....	Nt	..	Nt
Philadelphia, Pa....	T	2	v78; v80	v69; v48	Nt	O	Fp†
Richmond, Va.....	T	2	36; v72	24; v36	Nt	Y	E3%
Rochester, N. Y....	Nt	2	48	24	Nt	Y	Fp, †
San Francisco, Cal....	N	1	v150-30	v 66	Nt	Y	†

T Between tracks and on either side. V Varies according to service. N Nothing. N No. Y Yes. O Overhead also. Fp Free Phones for Public buildings. † Free use of conduits. ‡ New company, not yet operating, paid \$25,000 for franchises and 3 per cent. of gross receipts with 100 free 'phones. § They allow electric sprinklers on tracks and furnish power free. || New company to pay 2 to 3 per cent. gross earnings and furnish 50 free 'phones. p. c. Discount on city 'phones. \$ One company paid \$10,000. E Gross earnings. ‡ Conduits owned by city.

Good Roads Needed in Athens

THERE is an idea prevalent that only in America are to be found poor roads and that all roads on the Continent and in England are in first-class condition. A report from Athens, Greece, however, shows at least one place in which highways need improving. The roads that connect Athens with The Piraeus, its sea port, and with the bathing places on the Phalerum Bay, are narrow, badly graded and very poorly kept. In consequence transportation between these places is most disagreeable. Efforts have been made, however, to remedy these evils, and a new boulevard is now being constructed, starting at Hadrian's Arch on the Boulevard Amelia in the city of Athens, and extending directly to the shore of Phalerum Bay near the place where the ancient Athenians used to bathe.

The boulevard will be about three and two-fifths miles in length and ninety-eight and two-fifths feet in width. The intention is to divide it into carriage drive, a bicycle path, and a promenade, to be separated from one another by rows of trees. A wealthy Athenian lady has furnished the money to finish the boulevard, and this is estimated to cost \$58,824.

The new boulevard will intersect a driveway on the seashore which now connects the old bathing place with that of the new and with the Piraeus, and it is hoped that soon this driveway will be widened into a broad avenue to pass the zoological gardens now building. It is also to connect with another driveway which passes along the face of the bluffs on the west shore of the bay and along the ancient walls of The Piraeus down to its harbor.

Garbage Disposal of Hamilton

THE city of Hamilton, Ontario, contains a population of over 50,000, and includes within its limits 3,990 acres. The garbage is collected under the usual scavenger system except that the men are required to remove regularly all garbage and other rubbish from lanes and alleys. They must also clean the same, and cut and remove all weeds and grass.

Ashes, cinders, clinkers, garbage, house offal, broken crockery, old metal of all kinds, branches of trees, grass, weeds, refuse, straw and all kinds of refuse except manure and night soil, the householders must place in barrels or boxes and they are informed of the hour at which the wagons will call for them. Collections are made weekly except during the hot weather when a double number of trips are made. Heretofore it has been the custom to dump all the collections into the bay, but the board of health has determined upon the installation of an incinerator. When this is in operation the householders will be compelled to separate the garbage and house offal into separate receptacles, and these will be delivered at the incinerator. The rest of the refuse will be dumped into the bay, as heretofore. For the year 1897 the scavenger service cost \$6,275.

The excrementitious matter is also removed by the scavengers who

are licensed by the city, and the householders compelled to pay the cost of removal. This matter is used by the surrounding farmers as a fertilizer and together with the street sweepings, it is given to the farmers who make contracts to remove the same every night. The streets are cleaned by the city under the direction of a commissioner. All refuse from packing houses, together with spoiled meat from the market places, are sold to the manufacturers of fertilizers. The sludge which is pressed into cakes at the sewage disposal works is also used as a fertilizer, being worth \$2.12 per ton. Nothing has yet been realized from this as anyone who desires it can cart it away, but it is predicted that after the farmers realize the value, the city will be able to charge for this fertilizer on account of the great demand which will arise.

Cost of Gas and Electricity

ONE of our English contemporaries recently published the following table showing the comparative cost of gas and electricity for public lighting. By reference to the table it will be seen that light for light, electricity is outrivaled, as regards cheapness, by incandescent gas lighting. It is also evident that the cost per candle power per annum of the Welsbach burner amounts to about ten cents less as compared with an ordinary burner when supplied by gas at ordinary pressure, and it is \$1.25 less per candle for a 16-candle incandescent electric lamp for what is known as an ordinary four-foot flat flame burner.

Class of light.	Annual cost of gas.	Renewals.	Adjustment and fittings.	Lighting and cleaning.	Repairs to lamp.	Total cost per annum.	Total candle power.	Cost per candle per annum.
Flat-flame, ordinary 5 ft. burner	\$9.39	\$0.04	....	\$3.52	\$0.85	\$13.81	10	\$1.375
Flat-flame, ordinary 4 ft. burner	11.77	0.04	....	3.52	0.85	16.14	14	1.145
Welsbach incand. "C" burner.	8.20	1.00	0.33	3.52	0.85	13.91	50	.275
Welsbach incand. No. 3 Kern	7.75	0.87	0.33	3.52	0.85	13.33	60	.215
Welsbach self-intensifying b'r	23.75	2.12	0.66	3.52	0.85	31.12	300	.100
ELECTRIC.	Annual cost of current.							
16-candle incand. electric....	16.25	1.12	0.25	1.75	0.62	20.00	16	1.250

NOTE.—The 16-electric glow lamp works out as costing per candle twelve times more than the Welsbach self-intensifying system, six times more than the No. 3 Kern, and four and a half times more than the "C" burner.

These figures were compiled by Mr. Chas. Jones, Borough Engineer, and show the experience at Ealing, England.

Boston's New Subway

THE Boston Subway Bill which has been before the Legislature of Massachusetts for some time, has at last been passed by the Committee on Metropolitan Affairs. The bill provides for the construction as soon as possible, after the acceptance by the people of Boston, of a two track tunnel for the elevated trains, which are to be taken from the present subway and the latter restored to use for the use of surface cars. The act will be submitted to the people at the next city election. Within a year after the completion of the tunnel, the Transit Commission and the Elevated Road are to agree, or in case of their failure to agree the Railroad Commission is to decide, on the public necessity for the construction of a two track subway in addition to the tunnel. The new subway is to be used for surface cars in event of this, and the Transit Commission is authorized to remove all surface cars from Washington street within a year after the subway. Inasmuch as it will take three years at least, to complete the tunnel, and as a year will intervene before it will be decided whether the additional two track subway should be built, and as it will take three years to build that, and another year before the track will be ordered up from Washington street, it will be 1909 at least before the rapid transit problem of Boston is settled so far as contemplated by this bill.

The Boston Elevated Railroad Company is to lease the whole system from the time the use of the two track tunnel begins for a period of twenty-five years, at an annual rental which is to be equal to 4½ per cent. of the net cost of the tunnel and subway. The estimated cost of the tunnel is about \$4,000,000, although no limit has been

placed in the bill, and the City Treasurer has been authorized to issue bonds from time to time at the request of the Transit Commission. The city is to have for its property the existing subway, the East Boston Tunnel and the Cambridge street subway, as well as the tunnel and subway to be built under this act.

While the Legislature has not passed the bill at the time of writing its approval by the Legislative Committee was almost equivalent to its passage. As soon as it is passed the Rapid Transit Commission will make preliminary surveys, etc., and the work will commence as soon as the people have accepted the act.

Civic Improvement Leagues

For the benefit of those municipalities which have not yet organized an association for the purpose of utilizing the combined effort of their citizenship in improving the municipality, we publish the Constitution and By-Laws of the Civic Improvement League recently organized in St. Louis. It is one of the most progressive organizations of its kind in the country, in fact, we may say the most progressive at least in one particular, as it has recently commenced the publication of "The Civic Improvement Bulletin," which is issued for the purpose of keeping all its members well informed concerning the work not only of the local organization but of that in other fields. The Constitution and By-Laws recently adopted are as follows:

"ARTICLE I. NAME.—This organization shall be called the St. Louis League for Civic Improvement,' and it is designed to unite the efforts of all citizens who want to make St. Louis a good place to come to, and a better place to live in.

"ARTICLE II.—MEMBERSHIP.—Any resident of St. Louis shall be eligible to membership upon the payment, in advance, of the annual dues of two (2) dollars. A majority vote of those present at any regular or duly called meeting of the Executive Board shall elect to membership. Honorary members shall be elected in the same manner, but their annual dues shall be \$25.

"ARTICLE III.—OFFICERS.—The general officers shall be a President and six (6) Vice-Presidents, a Secretary and a Treasurer. In the absence of the President, he or the Executive Board may designate one of the Vice-Presidents to act in his stead.

"ARTICLE IV.—There shall be a general committee of fifty (50) members, appointed with a view to their different business and professional interests and geographical locations. The committee shall be appointed by the President as soon as possible after each annual meeting, and said committee shall have general control of the work and purposes of the League, and shall meet from time to time when called together by the President. From the General Committee of fifty, the President shall appoint an Executive Board to consist of seven (7) members, whose duties shall be to carry on the work designated by the General Committee, with all the powers of the General Committee upon matters which the said committee has not acted. It shall also be the duty of the Executive Board to formulate matters within the scope of the League and report the same to the General Committee. The Executive Board shall have power to organize from the members of the League auxiliary organizations in different wards and sections of the city, the objects of said organizations being to co-operate with and carry on the work mapped out by the General Committee or the Executive Board. The President shall be *ex-officio* chairman of the General Committee and the Executive Board, and both President and Secretary shall be *ex-officio* members of every standing committee.

"ARTICLE V.—COMMITTEES.—The President shall appoint the following committees to consist of five (5) members each: 1. Committee on Ways and Means; 2. Committee on Press, Publication and Public Meetings; 3. Committee on Membership and Organization; 4. Committee on Legislation.

The President shall, from time to time, appoint such special committees as may be necessary to take up particular work demanding the attention of the League.

"ARTICLE VI.—The Constitution may be amended at any annual meeting of the League by a two-thirds vote of those present, fifty members constituting a quorum, the proposed amendments having been first submitted to the Executive Board. And said amendments

may be made at any special meeting of the League called by the Executive Board.

"BY-LAWS.—1. The first annual meeting shall be held on the first Monday of March, 1903, and annually thereafter on the same date.

"2. The officers of the League shall be elected by ballot at each annual meeting. The term of office shall be for one year, or until successors are elected.

"3. In case of vacancy in any office, the same shall be filled by the Executive Board.

"4. All expenses in carrying on the work of the League shall be authorized or approved by the Executive Board; and all salaries shall be fixed by said Board.

"5. The By-Laws may be amended in the same manner pointed out for the amendment of the Constitution."

League of Wisconsin Municipalities

THE sixth annual conference of the League of Wisconsin Municipalities was held at Grand Rapids, Wis., during the first of June. Many of the prominent mayors of the State addressed the gathering and gave interesting talks upon matters both local to the state and of general interest to other municipalities.

Mayor Rose, of Milwaukee, spoke in favor of "No Charters for Cities." He said, "Were my counsel to prevail, the scheme of charter government would be abolished. I would apply the principles of self-government and instead of delegating the power I would grant all power, with prohibitions, exceptions and limitations calculated to reserve to the state those rights in which it has a direct interest by reason of its sovereignty. I would create the territorial boundaries of the city and grant to the inhabitants of that territory full and complete rights of government except as limited by express declaration. * * * Much time has been devoted to the construction of what is known as a model charter, but the effect has thus far proved fruitless. The same conditions do not prevail in all cities hence no fixed policy can be adopted for general application. Each city must deal with its own conditions."

Dealing with public ownership, Mayor Rose continued, "as the result of my experience, observation and study I believe that there are certain public utilities which every city should own and operate. These are water plants, electric light plants and garbage crematories." The Mayor outlined the condition of affairs in his city, telling of the new garbage crematory which has just been put in operation.

Prof. W. G. Aiechesser, of Baraboo, read a comprehensive paper on Wisconsin's water supply, dealing with the scientific and historical phases of the question.

Mayor Burt Williams, of Ashland, contributed a paper on the legislative needs of cities, and a general discussion followed. He said in part, "In the past all efforts to secure uniform legislation for Wisconsin cities have been the work of a few, while the great body of city officials have plodded on heedless of the needs and oblivious of the results. . . . United efforts of city officers ought to help materially in securing the charter legislation desired at the coming session of the legislature. Foremost among the kinds of legislation are the taxation laws." The great amount of property in cities that is exempt from direct taxation and particularly that which belongs to railroads, causes as much or more trouble to protect as that property which is directly taxed. He believes that city officials are in a measure responsible for unjust tax legislation in Wisconsin because of their indifference to the legislative acts.

F. A. Hutchings of the Wisconsin Free Library Commission, talked of the Free State Library as a department of State Government. He said that the library is a college for the poor and that the appropriations for it should be most generous.

Judge John A. Gaynor contributed a paper on Grand Rapids' plan of dealing with public utilities, especially the co-operative telephone system.

Mayor W. A. Wyse, of Reedsburg, gave an able address on "Municipal Ownership of Water Works."

At the close of the session the following officers were elected for the coming year: President, Mayor Burt Williams, of Ashland; vice-president, Mayor W. A. Wyse, of Reedsburg; secretary and treasurer, Prof. S. E. Sparling, of Madison. Ten district presidents were also chosen.

The Right Kind of Reform

For the last eight years Chicago's civic reformers have been conducting a campaign which has really reformed. The efforts of this work have been directed particularly toward the reformation of the Board of Aldermen. The success which has attended the efforts of this organization is not only gratifying and encouraging to civic reformers elsewhere but demonstrates very clearly what persistent, intelligent, effort will accomplish.

During the municipal campaign the League devotes its attention to the gathering of information concerning the candidates of the different parties. The record of each candidate, regardless of his politics, is carefully scanned and it is made known to the public through the press and circular letters. For example, the following is a sample record: "John Jones, Democrat, resides at 39 Commonwealth street; lawyer, 49 Clark street; voted against midnight closing; not present on Ogden gas vote; voted to increase police pay and over veto; has come down from the old days of franchise grabs and gang rule; his latter efforts have been curbed by reputable colleagues; he is worse than an object of suspicion and should not be re-elected." Such information is collected and widely disseminated throughout the ward and the city, and it has a most telling effect upon the result.

The league commenced its work in 1898. It was up-hill work that year, but out of the number of aldermen who were defeated only two had been recommended for re-election. Twenty-six of the outgoing aldermen, with bad records, were up for renomination, and only ten of them were successful, and of this number four were defeated at the polls. Greater progress was made in 1897 and in each successive year.

Dr. Samuel E. Sparling in *The Outlook* of June 21, in an article upon this subject, gives the result of the last election as follows:

"With the election which was held on April 7, 1902, the League closed its sixth campaign in the interests of an efficient and honest city government. The net results of this last election are summarized in the following table:

Number of Aldermen to be elected.....	36
League candidates elected.....	28
League candidates defeated.....	8
"Gray Wolves" re-elected	7
"Gray Wolves" defeated.....	6
Aldermen approved by League	55
Alderman condemned by League	15
Honest majority	40

"This summary does not tell the whole truth. The election was an 'off year,' since the Mayor was not to be elected, and consequently there was a light vote. A light vote usually favors the politician, but the fact remains that the Municipal Voters' League succeeded in defeating seven out of fifteen 'Gray Wolves.' Exceedingly close majorities were given in some of the other wards. Ficke in the Ninth Ward won by one vote, and his seat will probably be contested. 'Blind Billy' Kent had a majority of less than two hundred. 'Bath-House' John Coughlin's agents were arrested for bribery, and his seat will be contested. Some of these wards, for obvious reasons, are well nigh hopeless; particularly those wards represented by 'Bath-House' John Coughlin, 'Johnny' Powers, 'The Turkey Man,' and 'Blind Billy' Kent. While it is practically impossible to defeat Coughlin, still, for its moral effect, a most energetic and stirring campaign was waged against him by the League.

"In a course of a few years the Voters' League has transformed a corrupt and dishonest council into a responsible, intelligent, representative body of men. It has been able to do this by well-known campaign methods which have proved effective in the field of practical politics. It has concentrated the attention of the voter upon the character of the candidates by offering a fearless, straightforward statement of their public and private career. These statements at once take hold of the community, and their transforming power has been shown in the growing respectability of the Common Council."

—Mayor Erastus C. Knight of Buffalo, N. Y., expects to visit southern California and the Pacific Slope this summer with a party of Mystic Shriners.

Methods of Garbage Disposal

City Engineer Rosewater of Omaha, Neb., recently sent out fifty letters to different cities of the country asking how they disposed of their garbage. Omaha officials have been struggling with the question and the Engineer was ordered to report on the best solution of the problem. The following is the substance of the answers received:

Baltimore, Md.—Garbage is collected by city employees and is disposed of by being towed eight or ten miles down the river and sold to farmers as fertilizer or feed for hogs.

Bridgeport, Conn.—Has been using Dixon crematory, but is about to discontinue on account of excessive expense of running.

Charleston, S. C.—Garbage dumped in "salt water meadows" in outskirts of city, which are covered by tide twice each day.

Cleveland, O.—Contract with private company which, for \$69,400 per year, disposes of all garbage by reduction process. No disagreeable odor; entirely satisfactory.

Columbus, O.—Contract with private company, \$18,000 per year. Garbage shipped by rail to works, where it is cooked and oil for soap grease extracted.

Davenport, Ia.—All garbage dumped into Mississippi river.

Denver, Colo.—Garbage collected by hog raisers outside city, without expense to city. Contract is let to one man, who agrees to keep city clean; he districts city and sublets.

Detroit, Mich.—Contract with private company which disposes of garbage at reduction plant located several miles from city.

Duluth, Minn.—Has large area of land on "Bay front" of the city, to which garbage is hauled.

Hartford, Conn.—Garbage disposed of by burial in sandy ground.

Houston, Tex.—Has been using crematory plant two years; cost of plant, \$8,000; cost of operating, \$300 per month; furnace out of order and has not been operated for three months.

Indianapolis, Ind.—Contract with private company, which employs a desiccating process; cost per year, \$40,000.

Louisville, Ky.—Incinerator in process of construction; at present all refuse is carted to dump.

Memphis, Tenn.—Has four Dixon crematories located in different parts of the city; cost of cremation, 75 cents per ton; no disagreeable odors.

Nashville, Tenn.—Garbage dumped into Cumberland river; carcasses taken by fertilizer plant at small cost to city.

Newark, N. J.—Thousands of acres of low ground south of city used as dump for all refuse matter.

Peoria, Ill.—Garbage and other waste used in filling up very low tract land on opposite side of river.

Portland, Ore.—Garbage incinerated by plant erected five years ago; has been in constant use since; entirely satisfactory. In 1901 14,180 cubic yards of garbage were consumed at a cost of \$4,366.46.

Richmond, Va.—Garbage is burned in a crematory maintained at the city's expense.

Salt Lake City, U.—Garbage Crematory burned down in 1900 and city is now considering bids for new plant. The old plant cost \$13,000, and had a capacity of seven tons daily. The cost of running was \$337.41 per month.

Toledo, O.—Garbage disposed of by contract, the contractor hauling into country and dumping it in fields, where the farmers plow it under.

Wheeling, W. Va.—City has maintained crematory for several years; fuel, natural gas; capacity, thirty tons. Cost of removing garbage is \$7,000 per year, defrayed by city tax.

—The National Fire Protective Association held its annual convention at Philadelphia and discussed many matters relative to building construction and fire protection which will be published in their printed proceedings. The officers elected for the ensuing year are: President, C. A. Hexamer; vice-president, William A. Anderson; secretary and treasurer, Everett U. Crosby, Boston, Mass. Executive Committee—W. H. Stratton, chairman; F. E. Cabot, H. C. Stockdell, J. T. Taylor, C. M. Goddard, Herbert Wilmerding, W. H. Merrill, Jr., H. C. Henley, Albert Blauvelt, W. C. Robinson.

MEETING OF WATER WORKS ASSOCIATION

The 22d Convention—Large Attendance—Plea for Water Meters—Officers Elected

By Our Special Correspondent

THE 22d Annual Convention of the American Water Works Association was held at Chicago, June 10 to 13, with headquarters and place of meeting at the Auditorium Hotel. Including the two hundred members present, visitors and guests, there was a total of five hundred registered at this convention.

The meeting was called to order at the appointed hour on Tuesday morning, June 10, and opened with prayer by the Rev. Charles P. Stevens. In the absence of Mayor Carter H. Harrison a brief address of welcome was delivered by Mr. L. E. McGann, City Comptroller. He referred to the great waste of water in Chicago and to the difficulties experienced by that city in getting a good administration of its municipal water works. He expressed regret that the association did not include more men who were interested in the economic side as well as the technical side of the water supply question.

The President, Mr. William R. Hill, M. Am. Soc. C.E., Chief Engineer of the Aqueduct Commission of New York City, in his annual address gave a valuable summary of accidents caused by the failures of dams and reservoirs. "In addition to the more than fifty cases cited, forty-eight other failures of dams and reservoirs in this country have come to my notice," said President Hill. "It is very unfortunate that the records relating to them do not contain any description of the structures, the purpose of their construction or the cause of the failures. It is my hope that all who become acquainted with failures of dams or reservoirs will impart such knowledge to this association as well as to the engineering journals, whose columns contain many object lessons for our guidance and education."

At the morning session the President announced the death of Mr. Peter Milne, C.E., who was for several years secretary of the association. On motion of Mr. C. H. Campbell, of Charlotte, N. C., after J. M. Diven of Elmira, N. Y., had been appointed secretary to take the place of Mr. Milne, an adjournment was taken as a mark of respect to the three deceased members, the others being Mr. W. H. Laing, of Racine, Wis., and Mr. William Himrod, of Erie, Pa.

Mr. C. H. Campbell, of Charlotte, N. C., the President-elect of the Association, read a paper upon "Our Associate Members." He pointed out the importance of the work of the manufacturer as well as of the work of the technical journals devoted to the interest of water works.

The next paper on the programme was a paper on the White Plains, N. Y., Water Works, by Mr. James M. Farley, C. E., which was not read but ordered printed in the annual proceedings.

Mr. C. W. Wiles, of Delaware, O., presented a strong plea for the use of the water meter, which we present in full as it deals with one of the most important questions considered by the convention. A digest of the paper follows:

"Shall the meter be furnished and controlled by the municipality or water company, or by the consumer?"

"In many cases it is a hardship to compel the water consumer to purchase his meter, he may be a man of limited income and only a temporary resident of the city, and will have no further use for a meter when he moves away.

"If his meter fails to properly register the water consumed who is to repair it? He has no knowledge of its construction or means of repair, he cannot take it to his jeweler as he would his clock or watch, he cannot call in his plumber as he would in case of a broken water pipe; it must go into the hands of an expert in that particular class of work, and probably will have to be sent to the manufacturer for repair.

"The expense of repairs will probably be from one to five dollars, besides the express charges both ways, and he must rely on the Water Department to have this done for him; in the mean time how is the Department to know how much water he consumes while the meter is out; they must connect him up direct and guess at the amount used, or furnish him a temporary meter.

It is fair to assume that sixty per cent. of meters requiring re-

pairs, will have to be sent to the manufacturer, who alone have the necessary machinery and tools for properly repairing it. The Water Department must see that this is done, take out the meter, provide the customer a temporary supply, send the meter to the factory and on its return set it and collect the charges and remit to the manufacturer.

"In fact perform all the work as if the meter was owned by the Water Department. As a rule when a consumer pays from eight to fourteen dollars for a water meter, he believes he has a machine that will last him a life time, or at least as long as his clock, and when after one, two or three years it must go back for repairs, costing him from three to five dollars, he begins to think it a fraud, then in a year or two, more repairs, and after five or eight years he is informed that his meter is worn out and a new one must be bought, then he is sure he has been swindled, and that the water people and meter manufacturers are frauds.

"The writer is firm in the belief that all water meters should be owned and controlled by the Water Department or Water Company, and furnished the consumer at an annual rental, covering interest on first cost of the meter and reasonable repairs according to its size and cost, and require the consumer to protect it from frost; then the Water Department or company has complete control, and when a meter fails to work it is taken out and replaced by another from those in stock, and if only in need of small repairs, such as replacing a broken wheel, disc, or bolts can be done at the repair shop, but if in need of more general repairs, can be held and shipped with a dozen or more to the factory by freight, repaired and returned at a much less expense than a single meter.

"If the Water Department or company wishes to imitate the grocer and supply as he supplies his customers, then fix the rate per thousand and gallons at a price that will cover the expense of the meter and in time pay for it, as the grocer does with his fixtures.

"Under the advancing conditions of water supply, the Water Meter is as much a part of the plant as is the pumps, filters, valves and hydrants, and should be so considered by the municipality or water company."

Mr. John B. Heim, Superintendent of the City Water Works at Madison, Wis., presented a valuable paper upon the "Management of Water Works." He called attention to the criticisms of the not well informed municipal reformers. "To-day," said Mr. Heim, "we have a National Municipal League and Municipal State Leagues, composed of the Mayors of their respective cities, who seem to think that by having more power placed in their hands to remove or appoint officers, it is for better government. I cannot very well agree with them. The most changeable office in a city, is that of Mayor, therefore the appointive power should not rest solely in the hands of the Mayor, but under the control, or confirmation of at least three-fourths of the legislative body of the city. The only wise course to follow for a municipality, is to place the water department under a board of water commissioners, or a board of public works, equally divided politically in its membership, where only true merit holds the position of the employees, as under the civil service rules. Every business will suffer that makes continuous changes. That is the record to-day of many water works systems, under a municipality. Instead of being progressive, they are retrogressive. From leaders they are to-day followers."

Other valuable papers were presented at the convention of which we are unable to even give a digest for lack of space.

Detroit, Mich., was selected as the place for the next meeting of the association, and the following officers were elected for the ensuing year: President, C. H. Campbell, Charlotte, N. C.; first vice-president, L. N. Case, Duluth, Minn.; second vice-president, M. H. Sherred, Newark, N. J.; third vice-president, Charles E. Rowe, Dayton, O.; fourth vice-president, B. D. Atkins, St. Louis, Mo.; fifth vice-president, E. T. Frailey, Lancaster, Pa.; secretary and treasurer, J. M. Diven, Elmira, N. Y.

THE IDEAL POLICE FORCE

Every Policeman a Public Servant—Proper Men to Select—Good Detective Brand Needed—Esprit de Corps the Most Valuable Factor Chief Should Be Supreme

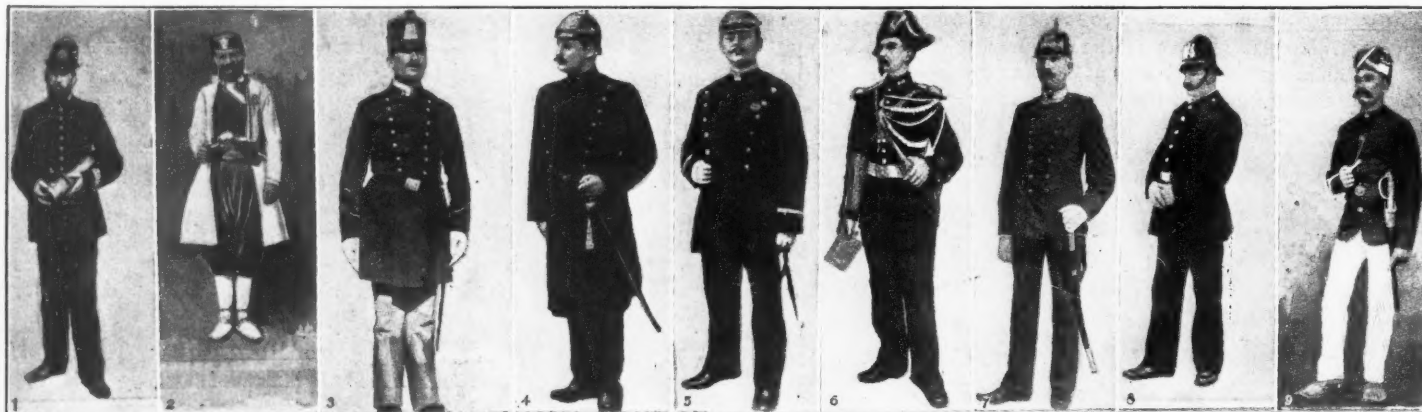
*By Sir Robert Anderson, K. C. B., LL.D.**

In his "History of the Criminal Law" Sir James Fitzjames Stephen writes with reference to the policeman's duties and powers that, "with some few exceptions, he may be described as a private person paid to perform as a matter of duty acts which, if so minded, he might have done voluntarily." This, of course, refers only to the powers of a constable at common law. If it were true practically, the task of organizing a police force would be a very simple one. But life in a large city like London or New York would be impossible; for no sane man would trust either his property or his person in such a crowd were it not that special police acts clothe the constable with large powers of which the common law knows nothing. And it is in the exercise of these powers that there is such abundant scope for police tyranny and corruption.

TWO SPHERES TO POLICE DUTY

Police duty may be roughly divided into the two spheres of public order and crime. Even if Adam had never sinned we should still want a police force in every large city, to regulate traffic and to deal with any other kindred matters. But human nature being what it is the sphere of police duty includes dealing with wrongdoers. And, further, the police are always liable to become wrongdoers themselves. And here the practical distinction to be kept in view is be-

something more. And with this I will deal presently. But first let me strongly urge the importance of creating and fostering a wholesome esprit de corps within the force. True discipline will do much to this end. I do not mean military discipline, for that is a poor business; but a discipline which influences character, and not conduct merely. In the formation of a regiment all that is essential is to obtain men who are physically fit for service, and military discipline will in due time make soldiers of them. But in organizing a police force it is essential to select men of good character. It is desirable, of course, that they should be physically upright, but it is essential that they should be upright in a higher sense. No political considerations therefore should influence the selection of candidates or the promotion of the officers. The policeman is the servant of the public—not of this or that section of the public—and the public in this wider sense has no politics. Therefore, it is that in London, for example, no "person belonging to the Metropolitan Police force" may "by word, message, writing or in any other manner endeavor to persuade any elector to give, or dissuade any elector from giving, his vote for the choice of any person to be a member to serve in Parliament." And the statute which contains these words goes on to provide that any one offending in this way "shall forfeit the sum of



POLICEMEN OF SEVERAL NATIONS IN THEIR UNIFORMS

LONDON.

MONTENEGRO.

ROME.

STOCKHOLM.

BERLIN.

PARIS.

VIENNA.

TASMANIA.

MADRAS.

tween police duties which are discharged openly and in the light of day and other duties in the discharge of which police officers are not subject to public observation or control. For example, in discharging the duty of keeping order in a public street there is practically no scope for dishonesty; and if an officer fails it will probably be in the matter of discretion or of courtesy. But it is otherwise when it becomes a question of reporting on the conduct of a drinking saloon or of bringing some rich criminal to justice.

POLICE OFFICERS PUBLIC SERVANTS

And one of the most difficult problems in organizing a police force is to provide incentives and checks adequate to prevent corruption in the discharge of these and similar duties. Underlying this problem is the element of that relationship between the police officer and the public, which is expressed by the English word "servant." I state it thus because I am not aware whether other languages possess a precisely equivalent term. And I do not know whether the word has exactly the same meaning in New York that it bears in London. Every police officer is the servant of the public. His official conduct, therefore, should be marked not only by integrity but by courtesy. The courtesy may be secured by proper discipline and a healthy public opinion, but the maintenance of integrity requires

* Late Assistant Commissioner of Metropolitan (London) Police and Head of the Criminal Investigation Department. Article and photos by courtesy of the *N. Y. Tribune*.

£100, to be recovered by any person who will sue for the same, and one moiety of the fine goes to the informer. I may add that this prohibition is scrupulously observed by the commanders of the police and all the superior officers of the force.

The first point, then, is the selection of candidates for the force. No influence should be allowed to secure the admission of men of bad or doubtful character. The next desideratum is to create a sound esprit de corps. If the public opinion inside a police force is apt, the officer who does a dishonorable or dishonest or otherwise wrongful act is looked down upon and the task of maintaining a high standard of duty becomes practicable. And this is not "a counsel of perfection." We all know how soon a garden may become a wilderness of weeds. We know, also, how easy it is, without any special effort, but merely by increasing watchfulness and care, to keep it perfectly clean and neat. And any one who has had experience in managing a large school or a police force has learned a similar lesson in the sphere of human nature.

HOW TO CHECK INFLUENCE OF BAD OFFICERS

But weeds don't corrupt the flowers in a garden; they merely choke them. Whereas, here the danger is not so much that the bad men in a force should outnumber the good, but that they should corrupt them. I hasten on, therefore, to deal with this element, and I will treat it in fuller detail. I assume that the Chief of Police

and his immediate lieutenants are men of position and character, men who are themselves above suspicion, and who command the confidence and respect of their subordinates. I assume, also, that they have exercised such intelligence and care in bringing in candidates that the bad men are a minority—black sheep in a good flock. The problem, then, is how the evil influence exerted by such men can be checked, and how they themselves can be detected. It is one of immense difficulty, and great judgment and shrewdness, combined with unsleeping vigilance, are needed to cope with it. Any system of espionage is fatal. But the same results may be attained in another way, without either impairing discipline or destroying confidence. Much may be done by a judicious change of officers; but the best solution of the difficulty is the formation of a good detective branch. This may seem a very simple matter, but in fact it is one of the most intricate problems in police administration. If the detective officers be separated so thoroughly from the ordinary police as to constitute practically a different force the hostility to which such a system will inevitably give rise ought to make undetected corruption difficult or impossible. But you might as well have two separate forces ab initio; for the one branch will not only neglect those duties which are specially assigned to the other, but the resulting hostility will show itself in thwarting the execution of them, e. g., the prevention of crime and the pursuit of criminals. This is, of course, in a special sense, the function of a detective branch; but it is plainly within the sphere of duty of every constable, and if it is to be left to the detectives, you must double your force at once.

RIVALRY WITHOUT HOSTILITY

The key to the problem is to promote a spirit of rivalry without hostility; to create a distinct esprit de corps in the detective branch of the force while maintaining the unity of the forces as a whole and insisting on harmonious co-operation between all sections of it. These words are easily written, but, as I have already indicated, the realization of them is most difficult. But though difficult, it is perfectly practicable. The illustration of separate regiments in the same brigade, or separate brigades in the same army, may seem apt, as a matter of fact it is misleading. Indeed, military conceptions of organization and discipline are generally harmful in the sphere of police. The one element common to both is unity of supreme control. The most difficult, the most responsible, and incomparably the most important of police duties are those that relate to crime, and therefore they should be the special charge of the chief officer of the force. Other police duties can be adequately controlled by a general supervision; these require personal attention. This arrangement will go far to assure that absolute unity of administration and discipline which is so essential to police work. And this element of unity should permeate the force. When we come to details, of course local circumstances and conditions must be taken into account, but the principle must be kept steadily in view. In the case of a small community, with a police force of a score of officers, the chief would naturally deal immediately with each of his subordinates and a chief who could not by his personal influence prevent not only corruption, but friction, would be unfit for his position. But this ideal state of things is impossible in great centres of population. The city must be divided into districts or divisions, and each district must be in a certain sense an imperium in imperio. And here we come to one of the paradoxes of police administration, namely, the necessity of decentralizing and at the same time of centralizing. Every district should be a separate unit, and yet a part of a large unit. It should have its own chief officer—superintendent is the title we give to the position in England—and, of course, what is true of the chiefs is no less true of the superintendents. They must be thoroughly competent and thoroughly trustworthy; otherwise it is idle to expect that these qualities will characterize their subordinates. But a superintendent's subordinates will be numbered by hundreds, and between him and the constables other ranks will intervene. In England we call them inspectors and sergeants. I will deal here only with the inspectors. These again must be good men, both officially and morally. At this stage we reach the ideal state of things possible in a small force; for every inspector ought to have close personal knowledge of his subordinates and their work. All this implies merely that some 3 or 4 per cent. of the staff of a police force shall be experienced and efficient police officers of excellent character; and in

any force that is not quite beyond redemption a much larger proportion of such men can easily be found.

DETECTIVE BRANCH THE PICK OF THE FORCE

But this is not all. The detective branch should be the corps d'élite of the force, and each superintendent will have under his immediate orders a certain number of officers belonging to it; and to these officers all the important criminal cases will be intrusted. Any inquiry, however, of a kind likely to tempt a corrupt or impecunious or weak officer to fail in his duty may at any time be transferred to the detective branch; and that branch, if properly organized may supply yet a further check. If a superintendent finds cause to suspect the integrity of his own subordinates in the conduct of an inquiry, it is open to him to obtain the services of an officer of the headquarters staff to take charge of it in connection with the local officers. The importance of being able in this way to use different officers, and officers with different associations, in the same duty, will be obvious to every one. If police work were like military duty, nothing would be easier than to embarrass any system of corruption by the frequent transfer of officers. But the effect of this would be not only to discourage and harass good officers, but also to lose the value of local knowledge, which is an element of great value. These objections, however, as experience proves, do not obtain in working the system above indicated, and there is nothing in the nature of spying in it. But the best possible system will not avail unless it is administered with perfect integrity and fairness. The principal officers of a police force must not only be honest and upright and fair, but all ranks must be made to feel that these qualities are in the ascendant; and, of course, they must be competent. An inefficient chief, however excellent his character may be, will never command the respect of his subordinates. The worst system, if administered by an able and honest man, is better than the best conceivable system in the hands of one who is wanting in these respects.

CHIEF SHOULD BE SUPREME

And unity of administration is also a matter of principal importance. Every police force has a nominal chief. But what is wanted is a real chief, a man who will have in his hands all the complicated threads of police duty. The mere patrolling the streets, to say nothing of the pipeclay and buttons part of the business, may to a large extent be dealt with through subordinates, for all such matters are open to public observation, and abuses cannot easily be concealed. But in regard to the more delicate and difficult spheres of police duty, as for example, keeping order under the surface, so to speak, and especially checking and detecting crime, everything should come under the same eye. The chief of a force numbering many thousands of men cannot be in personal contact with them. But he cannot fail to remark, for example, the difference in the number and character of the reports which come from this station or that respecting drinking houses or brothels and those received from other parts of the town. What is the explanation of it? Does it indicate better control? Or does it raise a suspicion of corruption? And so with crime. How is it that certain officers make so many arrests and others so few? How is it that so many burglaries occur here, so few there? And so on. A chief of police thus gains a general view and maintains a general control. He sends for different superintendents and inspectors as these questions arise, and arrives at a decision respecting them.

I do not suggest, of course, that every police report should be read in full by the chief. That would be impossible in a great city, for every crime without exception and every occurrence of importance should be reported to headquarters. But if a chief has efficient assistance the gist of everything will be put before him, and his attention will be specially called to whatever ought to be read in extenso. And I ought to add that my knowledge of the cleverness of dishonest officers forbids my supposing that they can be caught easily or immediately; but I do say emphatically that, with sound men in the higher ranks, and a good moral tone prevailing generally in the force, systematic corruption would be impossible, and no black sheep would long escape detection. But I again repeat, appointments to the force, promotions in the force, and the grant of rewards for zeal or skill in the discharge of duty—one of several incidental matters that the limits of space preclude my dealing with—must be wholly unbiased by "fear, favor or affection"—wholly unmarked by favoritism on any ground whatever, personal, social or political.

FIRE PROTECTION

System of Special Fire Mains the Coming Method—Replace Smaller with Larger Pipes—How Friction in Hose Reduces Pressure—Responsible for Conflagrations

At the meeting of the American Water Works Association, held at Chicago June 10th, Mr. Charles Arthur Hague, of New York, presented a paper on "Fire Protection," from which the following extracts have been made:

The general idea of to-day is to get at close quarters with a fire and put it out as speedily as possible: taking the hose into the burning building and fight the enemy upon his own premises. With this end in view it is necessary for firemen to become familiar with buildings, so that in the hurry of a fire, especially at night, time may be saved in reaching the field of action by a thorough knowledge of halls, short-cuts, etc. Such plans of operation make a science of fire fighting and enable a good officer to extinguish a fire with the least practical damage by water. When a fire gains considerable headway among combustible materials and is beyond close control, huge masses of water must be forthcoming at once.

SPECIAL FIRE MAINS

Direct water pressure at the hydrant, although under some circumstances admissible and capable, in proper hands, of good work in cities of smaller size, is really a thing of the past. The practice in some cities having direct hydrant system, of keeping in reserve a steamer or two, may be successful in many cases, but it is much safer to unequivocally tie up to the steamers at the first alarm and so keep these valuable pieces of apparatus up to pitch and service at all times. At present the steam fire engine presents the most general and reliable means of fire protection in cities. One of the principal virtues of the fire engine is that it is really a regenerator of power regardless of the water pressure in the mains. Yet in the larger cities it begins to look as though the present fire engine, large as it is, will before long, be a thing of the past. There is limit to the weight and size of portable engines on account of the means of propulsion and the kinds of streets over which they must pass. Still larger hose may be used but the greater pumping capacity required necessitates an engine which cannot be safely carried. The fire boat service is a partial answer to these difficulties but not all cities can utilize such boats. In New York, Philadelphia, Buffalo, Cleveland, Detroit, Chicago, Brooklyn, and a few other large cities these boats have developed into a valuable auxiliary of the fire department, and the system has been augmented by the laying of special water pipes for fire service leading from the water fronts up into the city. Six or more of the cities named have these special pipes, the system in the city of Philadelphia being the most pretentious so far attempted. It consists of over six miles of pipes varying in diameter from 16 to 8 inches; 150 special high pressure hydrants having a pressure of 300 pounds per square inch. The city is about to build a pumping station for supplying the system independently of the fire boats. This station is to contain engines of 17,000,000 gallons pumping capacity a day. Gas engines will be used to operate the pumps. This arrangement is proposed to save the great expense incidental to keeping up steam pressure in the service which is used such a small fraction of the time during the year. The use of these gas engines is dictated by motives of economy but it must ever be remembered that fighting fires in large cities has no relation to economy.

Even so-called fire-proof buildings contain enough combustible matter to completely clean out several stories by themselves, and so until the very acme of actual fire-proof construction is reached we must bear in mind that fires will catch, and that the only practical safe-guard so far known is to have water at hand in large quantities and under pressure enough to send it where it will do the most good. It would seem as though the use of independent fire mains either for special high pressure or with ordinary pressure, and for the use of steam fire engines would gradually make their appearance as regular fire department practice.

LARGER MAINS AN IMPROVEMENT

Very great improvement can be made to-day in many cities by a

re-arrangement of water mains, so that the fire department can get a copious supply of water even with the present fire engines and hose. There are many cases in which too many engines have been endeavoring to take water from mains of capacities far below the draught put upon them; and where a less number of streams of more active quality would have done better work upon the fire. Four engines with energetic streams under good working pressure will throw just as much water on a fire as eight engines with weak streams and low pressure; and the active streams are immeasurably more valuable for fire fighting. The reason is not far to seek, and it is this: the discharge of water through an orifice or opening is governed by the law of falling bodies, and the velocity increases very rapidly with the increase in the distance through which the body falls, or in the case of water, with the head of pressure. Therefore it follows that under a high pressure the discharge increases so that the lesser number of openings will eject the given quantity of water and at a greater velocity. Or the reverse of this proposition is, that with more openings, less pressure is required to eject the given quantity of water; and the matter adjusts itself in the matter of streams of water automatically and to the utmost nicety, to correspond to the pressure.

SHOULD ADAPT MAINS TO NEEDS OF DISTRICTS

It does very little good to merely spill water into a building upon the floors; the floors are the last places to catch fire; but the searching, dashing stream, capable of delivering more water at any one spot in a certain time than its weaker neighbor, will hunt out the corners and ceilings and give a good account of itself. A system of water mains capable of supplying the fire engines can be systematically planned by considering the dimensions and character of the buildings in the different parts of the city and the possible demand for water in case of fire; even going so far as to determine the probable number and size of streams, considering as well the demands for manufacturing in the different neighborhoods. Then the city having been distracted in this manner, the dimensions of the various mains for carrying what is needed may be determined the well-known laws of friction in the water. For example, it might be determined by the chief of the fire department that there might be times when he would require say ten streams to be thrown to a height of 150 feet, through various lengths of hose, using one and a quarter-inch nozzle, for the protection of some certain part of the city. The water required would be about 3,500 gallons per minute, or at a rate of 5,000,000 gallons per twenty-four hours, and as the height of the streams under the head for 150 feet vertical jet would represent about 75 per cent. of the static head for that pressure, the necessary pressure at the hose nozzles would be about eighty-eight pounds per gauge. As to the length of hose, of course each stream would have to be reckoned to correspond to the line used, but a pressure at the steamer allowing for the longest hose line would be certain for any shorter line. The frictional work would amount to about forty-five pounds for each hundred feet of two and a half hose, so that it will easily be seen where the pressure would go to for very long lines of hose. Of course the frictional pressure would not be cumulative for all the lines, but each line would take care of itself, the pressure enough to cover one would cover all if they were of the same length.

EFFECT OF WATER FRICTION

But for the sake of further illustration we will assume that all of the lines are 200 feet in length, and that it would require a pressure at the steamer of $88 + 90$, which would make a total of 178 pounds per gauge to do the required work. If the lines were only 100 feet in length, then the pressure would be only 133 pounds. And this shows the value of plenty of hydrants with shorter lines of hose. Hydrants are cheaper than hose, or at least good hose, or at least cost no more; and a hydrant fifty feet nearer a fire will save the use of fifty feet of hose and will give very much better service in the matter of streams. Now supposing that the water for these ten streams

came from hydrants which were in comparatively close neighborhoods; then the main having a length of say 1,000 feet without cross connections would require to be fourteen inches in diameter if we desired to keep the loss from friction down to say seven pounds gauge pressure. But it is more than likely that there would be cross connections and circuits, so this size would be modified to suit the conditions; but if in the manufacturing district, allowances would have to be made for the total demands, including the possible fire service and other demands. The reason that more hydrants and less length of hose will give more pressure and water, is that the areas of the cross sections of pipes and hose vary as the squares of their diameters, and the velocities of the water flowing through them vary inversely as the areas. Hence with twice the area, the velocity will be only one-half for the same quantity of water, and with four times the area the velocity will be only one-quarter, and, as the friction varies immensely in proportion to velocity, the pipe of large diameter will carry very much more water to a fire than the hose will, so the more pipe and the less hose the better; therefore, if you put in, say a \$40.00 hydrant, and keep out a \$40.00 length of hose you are nearer the fire with a better pressure of water with the same amount of money.

To reverse the statement of pressures; supposing there was an effective pressure at the hydrants of 125 pounds, which would be a pretty good pressure for straight hydrant service without steamers. The length of hose necessary to use 300 feet, and the nozzles one-inch smooth bore. Then the friction pressure would be about twenty-six pounds per 100 feet of hose, or seventy-eight pounds total friction loss, leaving forty-seven pounds for nozzle pressure, which would send the water up about ninety feet, delivering 170 gallons per minute from each nozzle used. If too many streams were used with this fixed type of pressure at the hydrants, so as to bring the hydrant pressure below seventy-eight pounds, then the pressure at the nozzles would fall off, and the streams become weaker. With thirty pounds at the nozzles, only seventeen pounds less than before, the streams would drop to sixty feet in height. If say six streams were in action under the forty-seven pounds nozzle pressure, it would only require three streams more to reduce the pressure to thirty pounds with the same amount of water delivered; and if this hap-

pened to be the capacity of the mains at that point, the pressure would fall very rapidly with still more streams; ten streams with a nozzle pressure of seventeen pounds, would deliver the same amount of water as six streams with forty-seven pounds; but at the height of the streams instead of being ninety feet would be only forty feet.

The above operation of friction losses will indicate how useful a steam fire engine is for re-invigorating the water energy to correspond to the length of hose required to reach a fire. Where a gravity system of water works is used the capacity for fire service is absolutely limited to the carrying capacity of the pipes and mains whether the supply is strictly from gravity from a distance or from a distributing reservoir from which water is pumped.

FRICTION IN HOSE RESPONSIBLE FOR LARGE FIRES

Careful consideration of this matter of friction in hose, and the pranks it plays with streams of water will throw considerable side light, not to say fire light, upon the conflagrations which now and then so unaccountably astonish the community in different parts of the country and which arise from what appear to have been small beginnings. In cities of moderate population, say of 10,000 or less, where water is distributed by direct pumping, this system of fire protection will suffice under proper conditions and management, but cases have occurred where great losses were sustained in which a sufficient pressure was had at the pumping station but the limited diameters of the distributing mains completely defeated the best efforts possible on the part of the fire department.

SPECIAL WATER MAINS THE FUTURE METHOD

The use of high pressure special mains is apparently the coming method for fire fighting, and the stationary fire pumping station on shore will be installed in larger cities. The dimensions of the mains should be determined by the number and sizes of the streams wanted at the most extreme points from the pumps, for in this system, even, we lose the regenerating work of the steamer. The pipes necessary to carry the water to the point of operation will be governed by the pressure thought best to be sacrificed in friction in the water going through them, leaving the necessary net pressure at the hose and nozzles for doing the useful work. In laying out such a system, care should be taken that there are no dead ends and a free circulation is a prime necessity.

DETECTION OF FORMALDEHYD IN MILK

A PURE milk supply is of the greatest importance to the health of any community and cities are coming more and more to provide the necessary guards for the prevention of the introduction and sale of impure milk. Milk is one of the food products that will not keep pure unless the strictest precautions are taken and even then the limit of time cannot be too far prolonged. However, milk drawn with proper cleanliness and kept in clean receptacles and at a fairly low temperature will keep pure and sweet a long time. Unfortunately these precautions are seldom taken and other means are adopted to lengthen the keeping period. Many preservatives are used, but to formaldehyd must be given the first place. Formaldehyd, which is the simplest combination of hydrogen, carbon and oxygen, appears on the market in an aqueous solution of from 33 to 40 per cent, and is disguised under various names, such as formol, freezine, preservaline, etc. It also appears in combination with other preservatives under different names.

While a skilled chemist could add just the proper amount of formaldehyd so as not to be injurious to a child and yet sufficient to preserve the milk, in practice the addition is in the hands of unskilled persons who, no doubt, do not know the strength of the solution they are using or even the character of it. They have been told to use about so much and that considerable more cannot be detected. Such conditions should be met by legislation and many states have made the use of preservatives a violation of their statutes.

Before a milk dealer can be prosecuted for the use of formaldehyd, it is necessary to detect the substance in the milk he serves. This is comparatively easy, provided one has a laboratory. Of the

many tests for the chemical, the following are some of the simplest:

Hehner's test: Place ten to fifteen cubic centimetres of concentrated sulphuric acid in a test tube and carefully pour down the side of the tube some of the milk so as not to mix the acid and the milk. If formaldehyd is present, a violet color will appear at the point of contact, instantly or after a short time according to the amount of the chemical. One part in 15,000 may be detected by this method. The acid must be 1.81 to 1.83 specific gravity and must contain a trace of iron. Add a drop or two of ferric chloride to the chemically pure acid. The charring due to the action of the acid must not be taken for the color reaction.

Hydrochloric-iron test: Add C. P. hydrochloric acid and a drop or two of ferric chloride to ten cubic centimetres of the milk and shake. Set the tube in hot water and, if formaldehyd is present, a purple color will appear. The test is very delicate; one part in 500,000 may be detected. The strength of the acid is not so important as a trace of iron. Repeat the test if a yellow color appears, using milk that has been diluted one to ten with water.

Jorissen's test: Add several drops of a 10 per cent. aqueous solution of chloroglucinol to ten cubic centimetres of the suspected milk, shake well and add a few drops of caustic potash or caustic soda. A red color shows the presence of formaldehyd. The test will show one part in 20,000, but the reaction may be obtained in the absence of formaldehyd in some artificially colored milk.

As errors will occur in all tests, it is advisable to confirm the reaction of one test by at least one additional method, but preferably more.

PREPARING FOR MEETING OF FIRE CHIEFS

A Pointer from Secretary Hills—New Committees—New York's Latest Fire House—Largest Department in the World

THE next meeting of the International Fire Chiefs will be the largest and most important in its history. As previously announced in the MUNICIPAL JOURNAL AND ENGINEER, it will be held in this city in September. The fact that it is to be held in the metropolis of the New World is of the utmost interest to fire circles throughout the United States. Many chiefs who have never attended any other convention are planning to attend this one.

The question has been raised whether those who have not been members of the association in the past will be entitled to all the privileges of the entertainment while in New York without paying the membership fee. Secretary Henry A. Hills, of Wyoming, Ohio, was written to about the matter and replies as follows: "The form of invitation is the same as is usually issued. But I am glad you have brought this point up. No one but members of the association is entitled to entertainment at the meeting, and badges can be given only to members."

MUST PAY MEMBERSHIP FEE

We have been asked by Secretary Hills and the New York Entertainment Committee to call the attention of all fire chiefs to this important item. Everyone, including the ladies, will be welcome, but in order to avail themselves of all the privileges of this important meeting it will be necessary for those chiefs who are expecting to attend, to send in their fee to Secretary Hills, of Wyoming, and secure a certificate from him, which upon their arrival in New York should be presented to the Committee on Credentials, when a badge will be issued which will entitle the wearer to all privileges, including entertainment. This course is made necessary as there

will be such a large attendance. We advise all of our fire chief friends to apply for their membership certificates, to the Secretary, so that there may be no delay when they arrive.

NEW COMMITTEES APPOINTED

Last week the Citizens Entertainment Committee held another meeting and appointed the following sub-committees:

On Entertainment: Matthew W. Bronson, Chairman; Lieut. Col. N. B. Thurston, Randall P. Barron, John H. Lyon and Anton C. G. Hupfel.

Boat Committee: Thomas E. Crimmins, Chairman; Augustus T. Docharty, John B. Hasslocher, D. A. Woodhouse.

Already a large number of exhibitors have applied for space at the

Grand Central Palace, and it is already assured that the exhibition at this convention will be the largest ever held. This feature alone will be worth the time and expense incident to a trip to New York to attend this convention. Every city should take immediate steps to provide for the sending of its chief to this convention, for the opportunities which will be afforded him for the study of scientific fire fighting will be very great and worth far more than the expenditure incident to his journey. From present indications it is evident that more than 1,000 fire chiefs from cities, towns, and villages, will be present at this convention, with their friends.

An opportunity will be given to all visiting delegates to inspect not only the headquarters of the New York fire department, but as many of the stations as the delegates may find time for. This in itself will be a liberal education in fire matters, for there is no city in the world which has so well organized, well trained, and efficient a fire department as that of the metropolis. This admirable state of affairs is largely, if not wholly due to the skill and energy of Fire Chief Edward F. Croker. Although he is one of the youngest chiefs in the service in the country, there is none better. When measured by efficient service and results, taking all conditions into consideration, the work of the New York Fire Department, under its present chief, is something remarkable. It will be interesting to our readers to know that during the latter part of last month Chief Croker completed his eighteenth year of service in the department. He was appointed June 22, 1884, at a salary of \$800, a few days before he was twenty-one years of age. His progress has been so

rapid that he is the youngest chief in the history of the department. He was made an assistant foreman Aug. 16, 1884; foreman, Feb. 25, 1886; battalion chief, Jan. 2, 1893; deputy chief, July 31, 1898, and succeeded Chief Bonner on July 1, 1899. His thirty-ninth birthday was celebrated by his friends on the anniversary of his entrance into the department, June 22. In last month's issue we told a "story" about the busy days of Chief Croker, which shows that he is no idler and that he has no time to play.

A NEW ENGINE HOUSE

Improvements are constantly being made in the department, and new houses erected. The accompanying illustration shows the latest addition to the department. It is located at 152d Street and cost



By courtesy of Horgan & Slattery, New York.

NEW YORK'S NEWEST FIRE HOUSE

\$25,000. There is a cellar underneath half of the building which contains four coal bins for the various grades of coal required by the department, a shavings bin, a sidewalk elevator, men's toilet and a steam heating plant.

The first floor is known as the "Apparatus Room," and measures 23 by 58 feet. Five stalls are placed in the rear and the sliding poles from the dormitory and sitting room above are so stationed that the men in making the descent from the rooms above land as near the engine or the truck as it is possible to locate them. In the rear of the apparatus room are placed a feed room, a work room, and a space for airing bedding in addition to a covered courtyard.

The walls of the apparatus room are finished in Keene's cement, cut out in imitation of tile, and the ceiling is of an ornamental metal pattern.

The second floor consists of the officers' room, sitting room, the dormitory and the general toilet. The floors are of yellow pine. A clothes dryer is also provided, consisting of four racks, which is used to dry the men's clothing, boots and blankets and is heated by steam. The lighting is gas and especial care has been taken to eliminate

wood work so that the sanitary features of the house are as nearly perfect as it is possible to make them in a non-fireproof building. All angles between walls and partitions and at ceilings are covered.

The first floor, or apparatus room floor, is of fireproof construction and is pitched from rear to front one-tenth of an inch per foot so that in flushing out this floor with a hose the water runs directly to the curb. This floor is of cement, cut out in four-inch squares. The floors in stalls are of asphalt and no stall fixtures are provided as the department considers it better for the horses to feed off the floor.

The front of the building, on Prospect Avenue, is faced up with red pressed brick; limestone trimmings for the first story, and terra cotta above.

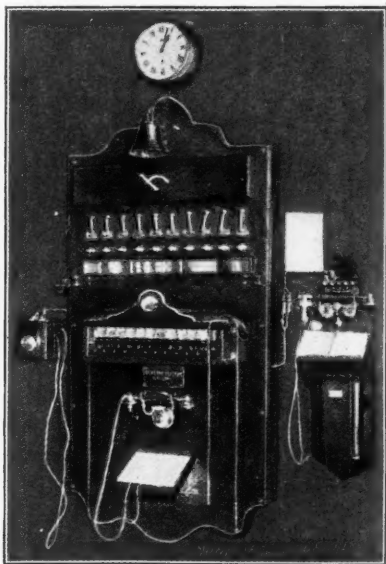
In the men's toilet room the following fixtures have been provided, namely: Three wash basins, a bath tub, shower room and water closets. The floor is of interlocking rubber tile, the walls wainscoted, the full height with Keene's cement, cut out in imitation of tile, and the divisions between bath room, shower room and wash room consist of two-inch cast iron posts, glazed between with one-half-inch thick rough plate glass.

STREET TELEPHONES FOR FIRE ALARMS

One of the latest advancements that has been made in fire alarm service has been installed in the district of Penge, London, England, where street telephones have been installed for the use of firemen. This district is thickly populated and is well provided with hydrants,

placed "on" a time switch will cause the bell to ring for half a minute. Below the switches is the station indicator, having one drop shutter and spring jack, and underneath these a telephone and a buzzer.

When a call comes in the attendant places the proper plug in the jack underneath the indicator, which is down, and if it is a genuine alarm the buzzer is set going. This can only happen if the box has been pulled. If the call is simply from the telephone these are dealt with in the ordinary way but if the call is a real alarm the time switch is set to call the brigade and the plug is then withdrawn. As the box handle has not been replaced the indicator drop would then fall again and the alarm bell would continue ringing, in addition to which a second call might not receive attention. Consequently to prevent such a state of affairs a special controlling device has been



TELEPHONE SWITCHBOARD

the water having a pressure of about thirty-five pounds. The fire department consists of two hose and ladder trucks, the latest horsed fire escape on sliding carriage principle, carried on a tender. The tender accommodates eight firemen together with one thousand feet of hose and miscellaneous instruments.

About the district are the telephone fire alarm posts, shown in one of the accompanying illustrations, which are connected with the fire station by underground wires, the return path for the current being grounded. The wires are laid in one and one-half and one-inch iron tubes, having inspection boxes every 110 yards. There are three miles of the tubes and ten miles of wire. The posts are so designed that alarms can be sent in by the public in the usual way, but the unique part of it is that it is fitted with a plug box to which may be connected a portable telephone, which is carried on the apparatus, and by which the firemen are enabled to communicate with the station. This can be done at any time whether the box has been pulled or not.

All the various functions of the switchboard at the station have been assembled in one board as shown in the illustration. At the top is seen the alarm bell, and below the call switches connected to electric bells in the men's house. These are so arranged that if



STREET FIRE TELEPHONE

provided which keeps the line in use until the box handle is replaced. The whole system has given the greatest satisfaction to the district, and it is likely that neighboring sections will install this system of telephone alarm.

NATIONAL MEETING OF POLICE CHIEFS

THE National Association of Police Chiefs of the United States and Canada held its annual convention at Louisville, Ky., on May 7 to 9. An enjoyable time was provided for the visitors by the entertainment committee and several papers were read by members of the organization that were of the greatest interest for the assemblage. In his address, President Sylvester urged the Association to stamp out anarchy by co-operation between police officials all over the civilized world. The international bureau of identification of criminals should be established as quickly as possible and thus lend its aid in the work against anarchists. He said, "The contemplated national bureau of criminal identification is the entering wedge which would assist in stamping out the growth of such an element." He also advocated a secret code to be used by police chiefs. The President recommended the court for juveniles and schools for police. These latter not to be simply for the interpretation of the laws and police annals by the members of the chief's staff, but the chief should himself proclaim the laws and propound hypothetical questions to the policemen and generally find out their views on police matters and so be able to correct mistaken ideas.

Chief Matthew Kiely of St. Louis, Colo., read a paper on "Can Criminals Reform?" Chief Kiely divided criminals into three classes, those who commit crime through weakness of morals or sudden temptation, through want of education and training among which class are found most juvenile offenders, and those who are criminals

by choice. For this last class their end in crime is on the gallows or in life imprisonment.

A paper on the Mexican Police was read by Mr. Carlos Romagna, who represented the Inspector General of Mexico. Chief William Moore of Binghamton, N. Y., discoursed on "The Policeman and the Boy." He said among other things that there should be more consideration for youthful offenders and less of the harshness usually shown them by the police.

Mr. Rhoderick Ross, Chairman of the Constabulary of Edinburgh, Scotland, addressed the assembly on "Anarchy and Anarchists" and endorsed the international bureau of identification for the wiping out of this scourge. He said that the police should enforce the imprisonment of this class of creatures. According to Chief Henry Muth of Allegheny, Pa., in his paper on "Opium and Criminals," opium causes more crime than any other habit with which humanity is afflicted.

During one of the sessions word was received from several of the foreign chiefs endorsing the aims of the Association and promising to attend next year. It is probable that the foreign chiefs will join the association during the coming year and in anticipation the name has been changed to the International Association of Chiefs of Police. As stated elsewhere in this issue, Chief Sylvester was elected president of this organization for the ensuing year. New Orleans, La., was chosen as the next place of meeting.

A YEAR'S SCOURGE OF SMALLPOX

AT the beginning of the past winter many physicians predicted that the epidemic of smallpox would be one of the worst in the history of the country, and in some cases this prediction has been substantiated. If it were possible to secure complete returns it would be seen that the outbreaks of smallpox have cost towns and villages, in the aggregate, immense sums of money. Thus one case in New Brunswick, N. J., cost the city over \$2,000, but the precautions taken by the health officers saved the city much more money by preventing the spread of the disease. The Hudson County (N. J.) Board of Health last summer, as a precautionary measure against the outbreak of smallpox, fumigated every trolley car within the county.

Much opposition has been shown toward vaccination as a preventive of smallpox, but while the anti-vaccinationists have procured figures that ostensibly prove the great mortality from vaccination, facts disprove them. Experience has shown that wherever a thorough system of vaccination has been put in practice, the spread of smallpox has been checked. Chicago presents, probably, the best example of a large city in which vaccination has been systematically and thoroughly tried. While three-fourths of all the cases of smallpox in the country during the last half year have occurred within the region about the city, the city itself has been remarkably free from the disease. The Health Department issued a circular, called the "Vaccination Creed," which told what proper vaccination was. The April issue of THE MUNICIPAL JOURNAL contains a copy of this circular. The Health Department, with the co-operation of the railroads entering the city, vaccinated all passengers of trains coming from infected localities. The city was vaccinated and revaccinated and every case carefully watched.

The anti-vaccinationists drew most of their ammunition from the trouble that occurred in Camden, N. J., where some eight or ten deaths occurred after the patients were vaccinated. It was claimed that it was due to impure vaccine. A thorough investigation made by the city authorities proved conclusively that in all cases the vaccine was pure and that the patients had contracted tetanus by infecting the wound from dirty bandages.

Health officers from all over the country have testified to the effectual remedy that vaccination afforded against smallpox. According to one of the Health Commissioners of Baltimore, Md., that city es-

caped an epidemic on account of the energetic work of the Health Department in the matter of vaccination.

The Health Board of Philadelphia made a house to house canvass of the city and vaccinated all inmates without charge. In January there were more than a thousand cases in the city and six schools were closed.

A law was introduced into the Legislature of New York State intending to compel every one to be vaccinated who had not been so treated during the last five years, but this was defeated.

Dr. Friedrich, Health Officer of Cleveland, O., freed his city of smallpox by thorough disinfection. Wherever there was a case of smallpox, the health officials descended on the section and disinfected houses, streets and yards within a radius of two or three blocks.

There is hardly a town of any size in the country that has not had one or more cases of the disease. In the larger cities free vaccination stations were established and the officials urged all citizens to be vaccinated. In many towns it was found necessary to close the schools until the epidemic was gotten in hand by the health officers, in some places the schools were regularly disinfected every week, and in many others the school authorities would not allow the children to attend unless they could produce certificates showing that they had been successfully vaccinated.

During the last year there have been many towns in which such a thorough quarantine was established that they were cut off entirely from the outside world. At Iron Mountain, Mich., all trains were required to pass through without stopping and all roads leading out of the village were closely watched so that no one could enter or leave. Similar precautions were taken at Lincoln City, Ind., Woodstock, Minn., Hackettstown, N. J., and elsewhere.

It was found that animals were potent factors in the spread of the disease. For instance, in Hoboken, N. J., the health officers ordered all stray cats and dogs to be killed whenever they were found on infected premises.

In all cases of the epidemic it has been proved by experience that the most stringent measures taken at the start regardless of expense were more than justified, and wherever the health officers were firm in enforcing their regulations at once, their towns were free from any serious outbreak of the disease.

FIRE STATISTICS IN AMERICAN CITIES

Including Those Having a Population of 20,000 to 36,000

Place.	Area in square miles.	Population.	No. alarms.	No. fires.	Confined to building.	Value prop-erty involved in fires on which claim for loss is made.	Total insurance thereon.	Insurance loss.	Total loss.	Loss per capita.
Quincy, Ill.	10	36,252	145	131	128	\$400,465	\$266,625	\$94,448	\$106,947	\$2.95
South Bend, Ind.	15	35,999	180	171	159	698,312	796,835	124,458	152,250	4.23
Salem, Mass.	7 1/2	35,956	138	110	108	472,118	369,085	78,020	.....	2.17
Johnstown, Pa.	7 3/4	35,936	56	56	55	102,550	39,400	8,329	10,514	.29
Elmira, N. Y.	9	35,672	173	173	170	.....	553,530	58,613	59,240	1.66
Allentown, Pa.	3 1/2	35,416	42	42	42	174,000	117,950	29,132	39,257	1.18
McKeesport, Pa.	8 1/2	34,227	183	183	180	.....	245,500	26,000	.....	.76
Chelsea, Mass.	2 1/4	34,072	152	152	151	512,007	443,525	14,292	21,853	.61
York, Pa.	5	33,708	55	55	54	.....	469,795	18,994	24,473	.73
Malden, Mass.	4 1-12	33,664	103	103	103	287,000	233,850	36,005	37,878	1.12
Topeka, Kan.	7	33,608	195	195	195	508,830	318,475	23,161	24,649	.61
Newton, Mass.	20	33,587	172	172	171	761,191	510,456	75,970	.....	2.26
Sioux City, Ia.	30	33,111	179	174	.....	.....	.....	148,920	162,808	4.91
Bayonne, N. J.	8	32,722	74	74	72	.....	.....	.....	25,000	.77
Knoxville, Tenn.	6	32,637	166	166	160	489,601	329,000	123,309	.....	3.77
Schenectady, N. Y.	2	31,682	115	115	114	.....	428,033	43,000	54,890	1.73
Fitchburg, Mass.	24	31,531	102	102	100	722,245	577,338	13,475	15,273	.48
Superior, Wis.	26 1/2	31,091	108	97	97	.....	689,846	32,491	.....	1.04
Rockford, Ill.	6	31,051	144	144	144	1,186,763	869,651	10,355	.....	.33
Taunton, Mass.	42	31,036	128	128	126	800,805	574,954	59,297	66,859	2.15
Canton, O.	6 3/4	30,667	133	124	121	958,390	708,495	45,311	.....	1.47
Butte, Mont.	4	30,470	149	149	149	1,811,100	1,118,600	32,483	34,500	1.13
Montgomery, Ala.	3 1-3	30,346	184	184	.....	713,185	549,275	60,449	70,167	2.37
Auburn, N. Y.	9	30,345	63	63	62	.....	.....	12,848	15,953	.52
Chattanooga, Tenn.	15	30,151	230	230	225	.....	514,540	.....	63,674	1.96
Joliet, Ill.	15	29,353	127	127	115	1,206,100	564,605	40,720	41,600	1.41
Sacramento, Cal.	5 1/2	29,282	180	180	169	439,455	266,963	37,772	76,972	2.63
Racine, Wis.	4 1/4	29,102	105	105	104	405,280	318,972	89,878	90,748	3.11
La Crosse, Wis.	8 1/4	28,895	171	171	169	268,151	133,375	11,239	12,146	.42
Jacksonville, Fla.	9 1/4	28,429	200	.....	.....	.....	.....	5,932,500	10,050,600	353.53
Newcastle, Pa.	6	28,339	142	142	140	418,000	176,200	11,350	14,600	5.11
Newport, Ky.	1 1/8	28,301	142	.....	.....	.....	.....	10,582	12,596	.44
Oshkosh, Wis.	16	28,284	130	121	120	259,735	168,075	49,906	67,306	2.38
Woonsocket, R. I.	8 1-12	28,204	92	90	.....	.....	245,695	30,816	31,566	1.12
Atlantic City, N. J.	1 1/2	27,838	126	126	126	.....	55,082	32,414	51,318	1.85
Ft. Worth, Tex.	7 1-32	26,688	143	143	142	700,000	412,190	41,998	46,938	1.76
Lexington, Ky.	4	26,369	243	243	.....	.....	.....	.....	71,630	2.72
Gloucester, Mass.	36	26,121	88	88	87	156,922	131,234	24,089	29,899	1.16
Joplin, Mo.	12	26,023	160	160	153	.....	.....	46,640	59,763	2.29
So. Omaha, Neb.	5	26,000	104	104	101	390,200	248,250	41,690	45,670	1.75
New Britain, Conn.	8	25,998	59	43	43	.....	.....	.....	40,000	1.54
Council Bluffs, Ia.	24	25,802	92	92	89	362,400	262,400	76,554	.....	2.97
Cedar Rapids, Ia.	13	25,656	149	149	143	678,437	428,527	43,179	45,334	1.77
Easton, Pa.	3	25,238	59	59	59	.....	.....	12,300	20,637	.81
Jackson, Mich.	9	25,180	124	124	124	849,358	374,775	55,024	.....	2.18
Newburg, N. Y.	4	24,934	29	29	29	.....	.....	6,446	10,846	.43
Wichita, Kan.	31 1/4	24,671	145	145	144	.....	.....	32,719	.....	1.32
Kingston, N. Y.	12	24,535	106	106	106	.....	.....	129,000	.....	5.21
Kalamazoo, Mich.	10 1/2	24,404	103	103	103	.....	298,925	12,308	12,611	.51
Everett, Mass.	4	24,336	72	68	66	385,144	241,550	34,802	52,851	2.10
Meriden, Conn.	3 3/4	24,296	53	53	53	.....	1,739,514	.....	27,972	1.15
No. Adams, Mass.	10	24,200	53	53	51	198,290	161,200	11,834	18,039	.74
Aurora, Ill.	7 1/2	24,147	113	110	110	691,005	477,875	8,633	.....	.35
Poughkeepsie, N. Y.	4	24,029	73	73	73	.....	.....	16,265	22,265	.94
Cohoes, N. Y.	11	23,910	36	36	36	.....	145,250	.....	13,347	.56
Quincy, Mass.	17	23,890	112	112	112	263,190	224,725	16,059	19,059	.79
Nashua, N. H.	33	23,898	100	100	99	160,000	155,625	77,134	.....	3.22
Lewiston, Me.	15	23,761	87	87	85	630,049	511,425	41,688	62,540	2.63
Zanesville, O.	10	23,538	98	98	96	.....	475,025	.....	54,144	2.30
Waltham, Mass.	13 1-12	23,481	79	79	77	.....	77,935	13,288	15,834	.63
Bloomington, Ill.	4	23,286	181	181	181	602,000	390,000	28,842	29,698	1.27
Macon, Ga.	4	23,272	154	154	151	1,591,376	1,028,977	37,441	42,228	1.81
Springfield, Mo.	18	23,267	200	200	198	275,400	222,367	68,572	69,482	2.98
Burlington, Ia.	10	23,201	108	108	.....	.....	.....	.....	90,800	3.91
Sheboygan, Wis.	5 1/2	22,962	78	73	73	.....	.....	20,574	21,024	.92
Clinton, Ia.	25	22,698	123	113	113	685,000	234,000	6,750	8,000	.35
Elgin, Ill.	9	22,433	110	110	107	208,200	143,200	25,178	30,750	1.37
Norristown, Pa.	6	22,265	31	31	31	170,000	127,567	27,229	.....	1.22
Austin, Tex.	9	22,258	87	87	86	150,970	31,020	.....	21,765	.98
Oswego, N. Y.	8	22,199	58	58	51	.....	359,275	18,015	.....	.78
Newport, R. I.	5	22,034	70	70	70	.....	424,750	7,357	7,454	.33
Bangor, Me.	6	21,850	128	128	123	524,589	330,490	98,375	102,427	4.74
Petersburg, Va.	10	21,810	90	90	88	.....	174,620	52,688	.....	2.41
Pittsfield, Mass.	6	21,766	60	60	60	394,915	287,391	28,429	28,529	1.31
Lima, O.	17	21,723	134	134	134	227,865	31,784	.....	.....	.....
Watertown, N. Y.	8 3/4	21,696	72	72	72	.....	313,000	4,638	6,861	3.16
Mount Vernon, N. Y.	5	21,228	39	32	32	185,360	139,300	10,580	.....	.52
Columbia, S. C.	5	21,108	70	33	30	.....	.....	.....	.....	.....
Wilmington, N. C.	4 3-5	20,976	104	104	92	832,710	585,697	86,663	93,903	4.47
Amsterdam, N. Y.	10	20,929	64	64	61	.....	.....	.....	43,252	2.06
Jamestown, N. Y.	9	22,822	51	51	50	336,975	171,000	26,556	27,275	1.17
Muskegon, Mich.	15	20,818	193	193	190	243,059	152,190	76,888	86,022	4.13
Decatur, Ill.	8	20,754	189	189	185	.....	950,969	175,595	182,896	8.8*
Leavenworth, Kan.	7 2-5	20,735	119	119	118	159,500	128,150	17,359	18,234	.88
Waco, Tex.	9	20,680	171	171	.....	.....	705,615	49,946	.....	2.41
New Albany, Ind.	9	20,628	134	134	133	246,300	98,500	7,305	7,305	.33
Shenandoah, Pa.	2	20,321	25	25	15	42,000	20,000	8,000	14,000	.69
New Brunswick, N. J.	5	20,006	61	61	59	146,400	112,300	.....	26,730	1.33
Anderson, Ind.	3	20,178	95	95	93	510,060	288,225	45,422	.....	2.25

From the report of the Committee on Statistics of the National Board of Underwriters.

LITERATURE ON MUNICIPAL TOPICS

Reviews of Some Important Books—What the Magazines and Reviews Have to Say About Civic Affairs—Municipal Reports Received

WHILE the subject of filtration of water and water supplies has been treated to great length in technical journals of various description, there have been few books published on this subject. Of these, however, not the least in importance is *Water Filtration Works* by James H. Fuertes. It has been within the last decade that the greatest advances have been made in the matter of the filtration of the water supplies of cities and the author of this book has taken the different processes up in detail and clearly explained them so that all can readily understand the workings as well as the elements that enter into the design and the cost of operation and construction. There are few technical books that have been written that so simply, clearly and adequately set forth the subject as this work of Mr. Fuertes. Not the least of the elements that enter into this work is the method pursued in treating the various subdivisions in order. The latest experience and information on the subject is embodied in the book and numerous tables show the tests that have been made on these filtration plants already in operation. A number of well-chosen illustrations further assist in rendering the work clearer.

Mr. Fuertes divides his subject into slow sand filtration and rapid sand filtration. Under slow sand filters he considers the design, construction and operation of these filters, the action of the filter and the numerous elements that influence the operation and the resultant effluent. The theory, design and operation of rapid filters are then taken up and everything necessary to know about them is to be found within this volume. He compares the slow and rapid filters as to cost, efficiency and the places to which either are best adapted.

A chapter on "Conclusions" is a valuable adjunct to the foregoing chapters as is the one on "Filtered-Water Reservoirs," which contains valuable suggestions as to the location, shape, capacity, etc., of these water basins.

In any city that is contemplating the installation of water works with accompanying filters, the officials should have a copy of this work to better guide them in the outlining of their plans. It is published by John Wiley & Sons, New York, N. Y. Cloth, 12 mo., 283 pages, \$2.50 net.

ONE of the many tests of the worth of a book is the rapid sale that it has among those directly interested in the subject under consideration. The rapid sale of *Sewage and the Bacterial Purification of Sewage*, by Samuel Rideal, D.Sc., and the demand for a second edition shows the worth of this work. This book is a careful review of the methods of sewage disposal especially those dealing with the bacterial processes. The author deals with subject from the point of view of the theoretical basis of the bacterial changes as being the important underlying truth of all practical schemes.

The "Characters of Sewage and the Primary Methods of Disposal" forms the subject of the first chapter. Two chapters are given up to the "Chemical Analysis of Sewage and Effluents" containing the official methods of collection and analysis, the recommendations of the British Association and the proposed standards of effluents. The bacterial tests for the purity of effluents are given in the section of "Bacteria Occurring in Sewage." Chapter VI. is devoted to "Irrigation and Sewage Farms" and a table of statistics of sewage farms follows. There are chapters on "Subsidence and Chemical Precipitation and Sterilization" and three devoted to "Bacterial Purification" considering the different materials, character of beds and the several processes. The last chapter contains valuable information on the agricultural value of effluents, distribution and distributors and trade effluents.

The whole subject is thoroughly investigated and the author has placed in a comparatively small space a vast amount of information. The book should be in the hands of every one interested or connected with sewage works. Published by John Wiley and Sons, 43 E. 19th street, New York. Cloth, 8vo., 316 pages, \$3.50.

The American Business and Accounting Encyclopaedia is a standard reference book for the use of accountants and business men, and is a comprehensive summary of knowledge of this subject. Practically all the information pertaining to accounts and business management, which is needed to carry on a successful business, will be found in the 1,090 pages of this volume. The idea of the editors has been not to consider the science of accounts so much as the practical part of bookkeeping. The book is handsomely bound in red morocco, and profusely illustrated by line drawings, which clear up any vagueness that might possibly appear in the text. Published by the Bookkeeper Publishing Co., Ltd., Detroit, Mich. Price \$10.

The International Year Book for 1901 forms the fourth volume of the series of these valuable books. While this edition contains less pages than that of a year ago, considerably more information has been compressed into its 900 pages, because of the fact that a greater degree of condensation has been effected. Certain classes of statistical matter which was formerly distributed under the separate state heading have been tabulated under general heads. This method permits more general discussion of a subject as a whole, and furthermore affords a better means of comparison. Among the items of interest treated are such as the decision of the Supreme Court in the insular cases and other events that have occurred during the past year. In the article on literature the principal books are not only described briefly but the current discussion of their qualities is outlined. Instead of taking up a few selected books a "running commentary" has been given on a large number of the most important books of the year. The large staff of eminent contributors lends the greatest authority to this publication. Published by Dodd, Mead & Co., New York City, N. Y. Price, cloth, \$3 net.

Periodicals

The Journal of the New England Water Works Association for June, 1902, contains a paper by George A. Stacey, Superintendent of the Marlborough, Mass., water works, on the *Marlborough Water Works* under his supervision. It is a good description of that city's water supply, and contains several illustrations showing the pumping stations, reservoirs, and the great pressure which is obtained by the standpipe for use at fires. This stand pipe is successfully used for fires and thus the city is sure of a steady and abundant supply irrespective of the consumption for domestic purposes. Boston, Mass. Price per year \$3.00; per number 10 cents.

"*Profitable Advertising*" for June, published by K. T. Griswold, 140 Boylston street, Boston, Mass., treats of the subject of electricity as applied to advertising. It is profusely illustrated and comprehensive. It will be profitable for those who are endeavoring to suppress bad street advertising signs to send for a copy of this issue of "*Profitable Advertising*," as it contains many suggestions which would be of value in achieving the desired result, for it is always good policy when condemning an objectionable street sign to furnish a substitute.

The Annals of the American Society of Social and Political Science for May contains some notes on the election at Chicago and the vote on municipal ownership. It speaks of the good work that has been done by the Municipal Voters' League and of the Bureau of Statistics and the Municipal Library. The work of the Municipal League in Philadelphia and the amendment of the constitution so that personal registration may be required are described. The forfeiture of the franchise by the water works company of New Orleans is noted and the report of the Board of Water and Light Commissioners of Duluth is received. Issued bi-monthly. Philadelphia, Pa. Price per year \$6; per copy \$1.

In *The Proceedings* of the American Society of Civil Engineers for May, 1902, is presented a paper by James N. Hazlehurst on the *Maintenance of Asphalt Streets*. Mr. Hazlehurst presents the experience that Paris, France, has had with this class of pavement, and states the practice in the United States relative to the maintenance of asphalt, and presents specifications for asphalt pavements which the writer drafted for the Department of Public Works for Mobile, Alabama. New York, N. Y.

In *The National Magazine* for June is a "story" of *Pittsfield, the Gem of the Berkshires*, by Major G. Arthur Tappan. The author briefly outlines the beauties of this Berkshire city, telling of its broad streets, its fine water supply and sewerage system, and of the manufacturing that aid in making it a centre of industry. A short sketch of *Fredericton*, N. B., Canada, is given by Charles G. D. Roberts. Boston, Mass. Price per year \$1.00; per copy 10 cents.

SYLVESTER BAXTER writes on *A Great Civic Awakening in America* for the June issue of *Century*. New York, N. Y. Price per year \$4.00; per copy 35 cents.

AMONG the many interesting articles in the June issue of the *World's Work*, are *The Confessions of a City School Superintendent* which tells of the difficulties that are met with by a school superintendent of a large city; *A Modern School*, by James E. Russell of Columbia University; and *Beautifying the Public Schools*, by Bertha D. Knobe, telling how the bare walls and unadorned yards have been changed by pictures and flowers into attractive school surroundings. What has been done in this line in different cities is mentioned. New York, N. Y. Price per year \$3; per copy 25 cents.

THE ludicrous condition of the state constitution of Ohio is told in the June issue of *The Forum* by S. P. Orth, professor of Political Science in Buchtel College in an article on *The Municipal Situation in Ohio*. He draws conclusions from the present constitution, viz, that "the organic law of a commonwealth ought either to be so flexible as to conform to new conditions, or ought to be amended at regular and frequent intervals, to fit it to the changing life of a growing state." He says that, instead of making general provisions that would apply to new conditions, the makers tried to do exactly the proper thing and of course failed. The great development of cities in Ohio has been accompanied by the greatest complexity of classification and inefficiency in municipal matters. All cities are divided into two classes and each class in turn into four grades and eight grades respectively. Villages are divided into two classes and hamlets from one class. "That purely local contingencies control this classification is shown by the fact that ten of these classes have but one city in each class, and that a new class is created and placed indifferently anywhere in the column, whenever a coterie of schemers find it to their interests to do so." Thus Cleveland, the largest city in the State, still belongs to Class 1, Grade 2. To avoid certain limitations of the constitution against special legislation, charters apply to cities with certain populations and not to classes. The population is so given that the law can apply to one city only. After citing numerous instances of the jumbled conditions of charters, the author goes on to speak of three ways that could be adopted to remedy matters. The Supreme Court might reverse its line of decisions sanctioning these classes; the constitution could be amended; and the present laws could be repealed, and a new code enacted. A State commission attempted the last method and made certain recommendations for a new code but, while it passed the Senate in 1900, it was recommitted to a committee on the day of its passage and never was heard of again. Beginning with July, *The Forum* will be published quarterly and the price will be \$2 a year and 50 cents a number. New York, N. Y.

JAMES T. WHITE writes for the June number of *Gunton's Magazine* a description of *The Gill School City*. Educators believe that, besides teaching the child useful things, schools should train it in practical morality and undertake the most important of all tasks, the rearing of citizens. The president of the Patriotic League of New

York organized the Gill School City, which is a system of self-government similar to the George Junior Republic. It is modeled after the municipal government and is actual self-government. "It provides unlimited opportunity for the play of the imitative and imaginative faculties, while it encourages and exercises self-respect, self-confidence, courage, astuteness, order, command, obedience, self-control, and all the graces of character." The United States government will introduce this system into the schools of Cuba. The scheme is to allow the children to elect their officers, including mayor, courts, police, etc., and it has been found that much better order and discipline is kept when the children are allowed to feel that they have a part in the management of affairs, and when this public opinion rules than any teacher could hope to maintain. The author gives numerous instances of how this has worked in practice and states that the Gill School City shows the children that laws are to protect rights and not to prevent freedom; that government officers are to be respected and obeyed and teaches them to be alert in all ways for the general welfare. The Patriotic League in New York urges every teacher to try this method and will assist in every way if application is made to it. New York, N. Y. Price per year \$1; per copy 10 cents.

THE May issue of the *Quarterly Journal of Economics* contains an article of 5,000 words by John R. Commons on *Wages in Municipal Employment*. He compares the development in the question of wages paid by the municipalities of England and America, showing that in Great Britain the "fair wages movement," originated by the working classes and "centralization of business" idea agitated by the business interests are responsible for the great advance in wages while in America "politics" is responsible for what advance has been made. In the United States the extension of the suffrage had the effect of excluding the business man from municipal government and the substitution of the professional politician. Thus the city government has been deprived of business ability and the business man has striven to tie the hands of the politicians by limiting the power of the city to engage in business. The author then goes on to show how the laborers have directed their efforts toward raising the rates of wages and cites many instances of the work in this direction comparing wages in America with those in England. "In public employment as far as hours and wages are concerned common labor gains relatively more than organized labor." The public is employing day labor pays the highest wages for the shortest day's work. Numerous tables are given showing the relative rates of wages in the two countries mentioned. He concludes that the "fair wages movement" in England caused a slight increase in municipal wages in England and a corresponding increase in wages paid by contractors on municipal works. In America however, "practical politics" produced an enormous increase in municipal wages and little or no increase in wages of municipal contractors. When the municipal contractors pay the same wages and grant the same hours as do the public authorities, much of the present differences between the cost of public and private construction and operation will have been eliminated. Boston, Mass. Issued quarterly. Price per year \$3; per issue \$1.

THE issue of *The Surveyor* for May 3rd, contains an article on *The People's Baths*, which was a paper read before the Society of Architects, by Walter W. Thomas, the vice-president. He briefly outlines the character of the baths in different English cities and suggests how they should be planned and the materials to be used, and shows the utility of the spray and shower bath for the people, especially the great economy there is in the use of them. London, England, Price per copy 3d.

In the *Strand Magazine* for May there is an article by H. J. Holmes on the *Making of a Policeman in London*. London, England. Price per year \$1.00.

Munsey's Magazine for May contains an article by J. Brent on *Washington, the Capitol City*. Price per year \$1.00; per copy 10 cents.

NEW TRUCK FOR FIRE DEPARTMENTS

Comes Off with Flying Colors at Tests in Columbus—Can Be Raised in One-Third of the Time—Fewer Men Needed to Operate Them

By Our Special Correspondent

AFTER the Seagrave trussed ladder became a necessity in every progressive fire department, the ingenuity of the inventor has been at all times bent toward its improvement. This has been done in many ways and many improvements have been made and given the public, that were not patented. Among the most important improvements that have been patented, are, the improved shoe irons on the end, which prevent the ladder from slipping on the ground, and the permanent dowels on the inside of the shoe irons, imbedded in the frame, to add to the rigidity and durability of the ladder. All the Seagrave ladders are now built under this patent, issued July 19, 1898.

This company manufactures, also, a solid side trussed ladder, not unlike the plain side ladder, not any heavier and very nearly as rigid as the open truss. This style is used in the extension of the new aerial ladders. Among other improvements are, the union lock for hand extension ladders operated by hoisting rope and locking on rungs and the extension base attached to ground extension ladders. The value of a six-foot ground base on a 24-inch ladder is self-evident.

THE INVENTION OF MR. SEAGRAVE

All this time Mr. Seagrave has had an idea that an aerial ladder should be built that firemen with little drilling, could operate and require no more men in the crew than a city service hook and ladder truck. About a year ago, he placed a small hoisting device on an old Preston truck, and it worked so well that it was decided to build them for general use. The improvements and value of the machine, as built by the Seagrave Company, lies principally in the hoisting apparatus, which consists of a pair of tubes containing coiled springs of sufficient strength to balance the weight of the ladder and a screw governor working in universal roller and ball bearings which entirely overcome any possibility of the screw binding in any position. As the springs expand in raising the ladder, there is no possibility of their breaking, and, should any of them break (which has not occurred in more than a year's experimenting) it does not affect the working of the hoisting device, and can be easily replaced.

By the gear attached to the governing screw, the ladder may be easily withdrawn from the building when fully extended, or it can be raised or lowered by two or three men without the springs. The screw governor prevents the ladder from raising instantly, but permits it to be raised almost perpendicularly within ten seconds without effort on the part of the operator; the hose men who are fresh for service are then ready to ascend the ladder without the exhaustion of elevating it, and can be at the top of it within one-half minute after the truck is placed in position.

HOW THE NEW TRUCK IS OPERATED

The extension is operated by a phosphor bronze cable and drum with balance wheels; it is very light and strong. There are no complicated parts that can get out of order, and being always under the absolute control of the opera-

tor, the crew has all the time to devote to the saving of life or property.

The original cost of the truck is not more than any of the common aerials now in use, and the saving in number and strength, of men operating it, will absorb the entire cost of the truck within two years.

The truck will be built in all standard sizes from fifty to eighty-five feet and equipped as desired. The New York City fire department has had an 85-foot and 75-foot Seagrave aerial in service since February, 1902.

On April 24, the Columbus Fire Department gave a public exhibition of the New Aerial Truck, built by The Seagrave Company for the city of Wheeling. The exhibition took place on East Broad street in front of the Board of Trade Building, which was especially suitable for the purpose, as an 85-foot ladder just reached above the roof on either side of the central tower, and the seventh story windows of the new Outlook building adjoining on the east.

The firemen who operated the ladder had never seen it work, and were not practiced in handling it, consequently they were not expected to make any record breaking performances. There was a large crowd of citizens and city officials present, and among the visitors were Chief J. A. Archibald and Asst. Chief Campbell, of Cincinnati; Chief Willoughby, of Lafayette, Indiana; and Chief Major Edw. Hughes, of Louisville, Ky., who were much interested in the tests.

COMPARED WITH THE OLD STYE

At the suggestion of some of the visitors, Chief Lauer was directed to bring out the best aerial truck he had in service in the city department and try it with the new machine. The accompanying photographic snap shot tells the story well. Two men were placed on the Seagrave ladder to raise it and run out the extension and two to operate the turn table, while the city department used eight men on its truck for the same purpose. At the word "Go" both crews went to work with all their power and a man landed on the roof to the Board of Trade Building over the Seagrave ladder in forty-two seconds: the photograph shows the two men operating the ladder and the man starting for the top; it also shows where the city department ladder was at this time. In 128 seconds from the word "Go," the city ladder landed a man on the roof.

The 85-foot Aerial Truck illustrated herewith, was put in service in the city of Wheeling, W. Va., on the first of May, when the firemen landed the ladder fully extended against the top of the Exchange Bank Building, in twenty-four seconds.

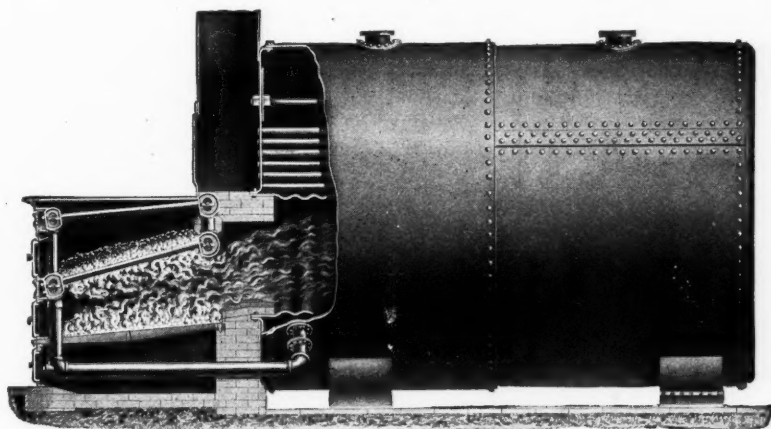
The Wheeling Fire Department, the Council committee and the business men of the city, all unite in their hearty satisfaction with the truck and take great pride in showing its advantages to all interested. Chief Cline prides himself on having in his department the best and most improved machine of its kind in service in the United States and being the first town outside of New York City to be so well equipped.



THE NEW SEAGRAVE TRUCK

To Abolish the Smoke Nuisance

MANY of the cities in this country find it impossible to secure anthracite coal. For this reason many people think it necessary to have clouds of black smoke resting over the city, as in Pittsburg,



Cincinnati and many others. We will admit that this is an excuse, but it is not a good reason why the nuisance should be tolerated. There are several remedies which have been repeatedly demonstrated as effective. One of them is found in the Hawley Down Draft Furnace, manufactured by the Hawley Down Draft Furnace Co., Chicago, Ill. Before the American Society of Mechanical Engineers, Mr. William H. Bryan, M.E., C. E., of St. Louis, said:

"Probably no mechanical device has done so much toward the practical solution of the smoke problem in St. Louis as the down-draft furnace. Until this apparatus was developed there was a certain character of steam plants—or rather of steam service—to which it seemed that none of the existing forms of smoke-abating furnaces could be satisfactorily applied. In these plants the demand for steam was such as to make it necessary at times to crowd the boilers far beyond their rated capacity. Or else the work was subject to frequent and extreme fluctuations, often greatly exceeding the rated capacity of the boilers. It may be said, of course, that this is abuse, rather than proper use, of a boiler plant, but nevertheless, these conditions exist, and it is sometimes impossible either to modify the conditions or increase the boiler capacity.

"The fact that there seemed no practicable or reasonable remedy for these cases retarded the growth of the smoke-abatement movement in St. Louis for many years. It was thought unwise to pass and attempt to enforce smoke-abatement ordinances when it seemed impossible for some of the plants to stop the smoke, under reasonable conditions. The demonstration of the fact that the down-draft furnace made a good smoke record possible, **EVEN WITH OVERWORKED BOILERS** doing variable work, and with a **MARKED ECONOMY IN FUEL**, may be said to have marked an epoch in smoke abatement. Our experience in St. Louis leads us to believe that smoke from boiler furnaces can now be abated by practical means, without hardship, no matter what the type of boiler, the character of the work required of the plant, or the kind of fuel used.

"I speak thus highly of the down-draft form of furnace with no intention of denying the merits—for they are many—of other smoke-abating devices. Many of these do excellent work under most of the conditions occurring in practice."

New York City is having its first real serious experience with the smoke nuisance, and the citizens are thoroughly incensed against the manufacturers, and the city has undertaken the abatement of the nuisance. Ordinances prohibiting the use of soft coal, except where the Hawley Down Draft Furnace and similar smoke preventive devices are installed, will be vigorously enforced. It is clearly up to the city officials of any city to see that this nuisance is abated. There are devices which will eliminate this evil, and city officials should see that either hard coal is used or the modern smoke preventive appliances are installed.

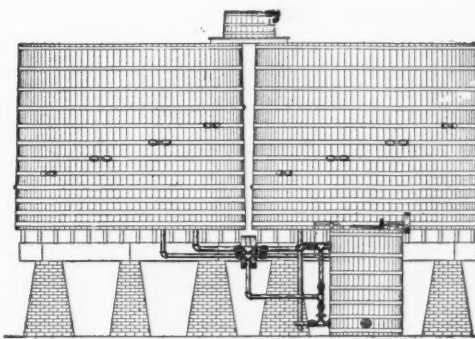
The Twentieth Century Typewriter

THE Smith Premier Typewriter Company has just issued a new and attractive American edition of its machine catalogue, artistically printed, exclusive of cover, in two colors upon 32 pages of heavy enamelled paper. The illustrations of typewriters, typewriter parts, desks and cabinets, are printed from hand-tooled, vignetted half-tones made in the highest style of the engraver's art.

The cover of this catalogue, which is of flexible board, is unique in design and handsomely lithographed in fourteen colors. It is divided into two panels, one of which represents a comely Indian maiden in fringed buckskins, beads and moccasins, leaning upon her bow beside a quiet pool in the heart of the forest. Her attitude is that of meditation. The opposite panel shows an office interior with all its modern equipments, in the fore-ground appearing a young woman stenographer transcribing her notes upon a Smith Premier Typewriter.

It would be difficult to present a more striking illustration of American progress than is here given, or of the advancement of woman in America during the past century. The whole design is illustrative of the motto of the Smith Premier Typewriter Company, "Improvement the Order of the Age."

Water Softening Apparatus



The New York Continental Jewell Filtration Company has lately added a new department to its extensive water purification business that of water-softening for boilers and industrial purposes.

This is a method of removing the hardness of mineral impurities

that well waters and many river waters carry in solution, and which is a source of enormous expense and trouble with many railroads, manufacturing establishments, etc.

This line of work has been made a specialty by the Wefugo Company for a number of years. It, however, retired from business a short time since, the New York Continental Jewell Filtration Company purchasing its patterns, unfinished stock, etc., and secured the services of Mr. F. B. Leopold, who is thoroughly familiar with this class of water purification in all its branches, having been the General Superintendent of the Wefugo Company, and having had charge of the design and erection of their plants.

The illustration herewith presented is one of the standard types of the intermittent water softening plants, which has just been erected and put in operation for the Lackawanna Iron & Steel Company, Cornwall, Pa. This is the type of apparatus that is most highly recommended as combining simplicity of construction and operation to secure the best results with the least amount of technical knowledge in the operation of it. The plant as shown consists essentially of two large settling or precipitating tanks, each holding sufficient water to supply the 800 H. P. boilers, six hours. Each tank is equipped with one of the Company's standard design agitating apparatus, which is operated by bevel gears set beneath the centre of each tank, for properly mixing the solution, after the water is treated with same.

The gears are operated by a line shaft run from a small motor set between the two tanks. A vertical shaft running up through the centre of the tank carries the stirring arrangement for agitating the water, and the method of treatment is as follows:

The first tank is pumped full of water which is intended to be used;

the necessary amount of chemical reagent for treating the water is then dissolved in the small tank, set on top of and between the two large tanks. This solution is then run into the water and the agitating apparatus set in operation and allowed to run for such a length of time as is necessary to secure a complete and thorough mixture; the chemical reagents used combine with the mineral impurities in solution in the water, changing them from a soluble to an insoluble condition, in which condition they precipitate to the bottom of the tanks.

As a complete precipitation, however, would require tanks of too great capacity, this mechanical part is assisted by the use, in connection with the settling or precipitating tanks, of one of their standard gravity filters; water flowing from the settling tank into the filter bed, and the lighter precipitations or flocculent matter is here intercepted; the water then issues from the filter perfectly bright and clear, practically free from all mineral impurities in solution, and results from this treatment have been universally satisfactory.

We understand there are in use in the neighborhood of 100 plants of this type. The following shows the analysis of the water treated, and the condition before and after treatment, at the Lackawanna Iron & Steel Company plant, Cornwall, Pa.

ANALYSIS OF WATER BEFORE TREATMENT

Calcium Carbonate.....	3.68	Grains per U. S. gallon
Calcium Sulphate.....	3.46	" " " "
Magnesium Sulphate.....	5.66	" " " "
Silicia	1.03	" " " "
Iron & Al .....	.08	" " " "
Organ & Volatile	2.78	" " " "
		16.78
Total Incrusting Solids.....	13.91	
After Treatment there remained.....	2.66	

The New York Continental Jewell Filtration Company has lately installed plants at the following places: Iroquois Portland Cement Co., Caledonia, N. Y., 500 H. P.; J. Frank Post, Newark, N. J., 150 H. P.; Marion Brewing & Bottling Co., Marion, O., 200 H. P.; Lackawanna Iron & Steel Co., Cornwall, Pa., 800 H. P.; Louisville Electric Light Co., Louisville, Ky., 4,000 H. P.; Columbia Chemical Co. Barberton, Ohio, one of their automatic plants of 5,000 H. P.; Cincinnati, Lawrenceburg & Aurora Elec. R'y North Bend, Ohio, 600 H. P.

The company is prepared to install plants of any required capacity for any industrial purpose desired, either of the intermittent or automatic process, and will be pleased to furnish detailed information to any parties who may be interested in this apparatus.

"Twentieth Century Limited"

"THE Four-Track Road," commonly known as the New York Central, is one of the wonders of the present day. It traverses the most picturesque region of New York State, thence extends through the far regions of the country, employs thousands of men, all of whom, from the highest official down to the one discharging the smallest duty, are filled with the one desire, to carry faithfully their "message to Garcia." In point of equipment and service, the New York Central is unexcelled by any railroad in the world, and there are few that can approach its achievements. It not only runs its trains on time, so that people along the line have learned to set their watches and clocks by the fast trains that pass back and forth daily, but it looks out for the comfort and safety of its passengers. Its most recent achievement in point of time saved by fast service is found in its "Twentieth Century Limited," to run from New York to Chicago in twenty hours. It leads all other roads in the literature in which it makes its public announcements. The June number of the "Four-Track News" is the most attractive issue yet sent out. It can be secured by sending to Mr. George H. Daniels, G. P. A., New York, and enclosing five cents for postage.

Automatic Book Typewriter Table

THE Elliott & Hatch Book Typewriter is supplied with an automatic table which is equipped with a special top, which automatically adapts itself to every record book. The back of the book fits between the tops of the two platforms and its weight adjusts them automatically. If, for instance, the entry is to be made in the front of the open book, the right-hand platform automatically depresses to a point which levels the thick with the thin portion of the book. When in position, the platen is drawn down and rests upon a rubber-tipped metal stop in the front section of the table. The leaf to be written is then brought over the platen and the machine proper turned down, holding the leaf firmly in position for writing.



As the writing is being done the entire carriage moves along the surface being written, and is so arranged that it will write to the extreme top or bottom or either side of the page, which is held in position by the retaining frame. As page after page is written upon, released and turned, the roller-bearing platforms which carry the weight of the book adjust themselves to the position which the book assumes, and permits of easy adjustment to right or left-hand pages, as occasion requires.

The springs which support these platforms are adjustable and should be carefully adjusted to accommodate the weight of the book to be written. If the springs are so stiff that the book does not fall into proper position, the wrench, which accompanies the table, should be applied to the nut on the rod around which the spring supporting the platform is placed, and dropped to the proper adjustment.

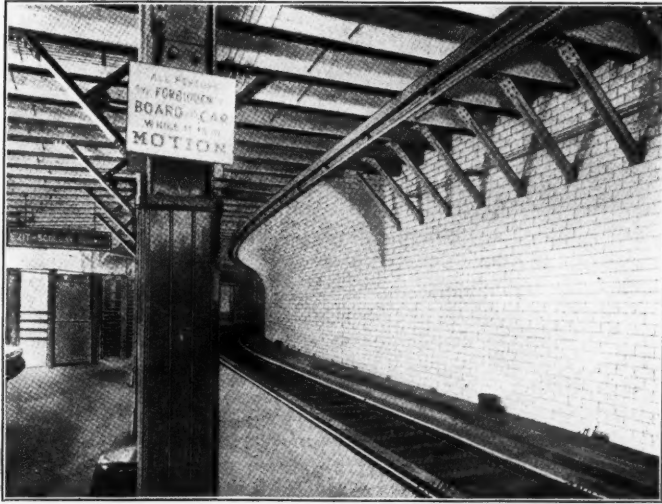
Enameled Brick in Subway

THE city of New York is to follow the example of Boston and use the enamelled brick in its subway stations. The moisture which percolates through the walls of a subway is a subject to which the construction engineer has to give attention. When ordinary brick or other material are used for the purpose of walling up the interior of an underground station, the water forcing its way through such a wall not only makes a blotch upon the interior surface but often times is the cause of unsanitary conditions.

To avoid these conditions The American Enamelled Brick and Tile Co. of New York, which has a contract for supplying the material to be used in the construction of the subway underground stations, has made an enamelled brick which not only succeeds in preventing moisture from forcing its way through the walls, but also provides drainage from the back of the brick.

With the complex conditions of present day living many things have become necessary which in the days of our fathers were not only undreamed of, but were not at all essential to the maintenance of public health. Now that our congested centres have become such

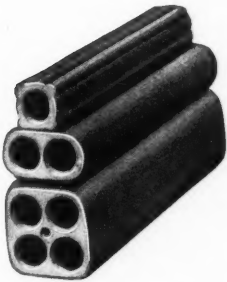
busy beehives, every precaution should be taken to conserve the public good. The uses of enameled brick, not only in subway stations, but in lavatories in public buildings, and elsewhere, have become a necessary factor in maintaining a healthy condition. The sweating or condensation of moisture, so often inimical to healthy conditions, by the use of enameled brick is absolutely prevented.



BRICK IN BOSTON SUBWAY

Enamelled brick should be used far more liberally than it is. The dark interior or sub-cellars of public school buildings, public baths, public conveniences, should be constructed of this kind of brick. The health authorities would act wisely in making a special inspection of conditions in their respective cities for the purpose of ascertaining where enameled brick can be used to better the local conditions. The accompanying illustration shows a portion of the Boston subway, which has been fitted up with the product of this firm.

Underground Wires



THERE are many reasons why overhead wires should no longer disfigure the streets of our cities. The chief reason is that they are a constant menace to human life. Besides this they block the way of firemen and are among the most objectionable of the street fixtures. Within the last few years the wires have multiplied so largely that in the business portions particularly it has become necessary to put them underground. Municipal officials are awakening to the

need in this direction, and for this reason there is now a very brisk trade among the electrical conduit manufacturers. The Scranton Fir Brick and Conduit Co., of Scranton, Pa., reports an enormous demand for its multiple conduit. One of its recent orders, received during the month, was for 250,000 duct feet for Seattle's Electric Company, Seattle, Wash.

This work of placing the wires underground is not confined to the larger cities although they were the first to lead in the improvement. There are only two cities in the country where all wires, including trolley wires, have been ordered underground within a certain portion of the business districts, viz., New York and Washington. In these cities all trolley wires are placed underground. This is not practicable for all cities because the expense entailed is too great to be contracted by most of the street railway companies in smaller municipalities. The little city of New Britain, Conn., is completing a system of underground conduits at quite a large expense for so small a municipality. It has set an example in this regard which other cities should not be slow to follow. The American municipalities, however, are, as a rule, quick to take up any improvements of this kind, and it will not be long before wires strung on poles in

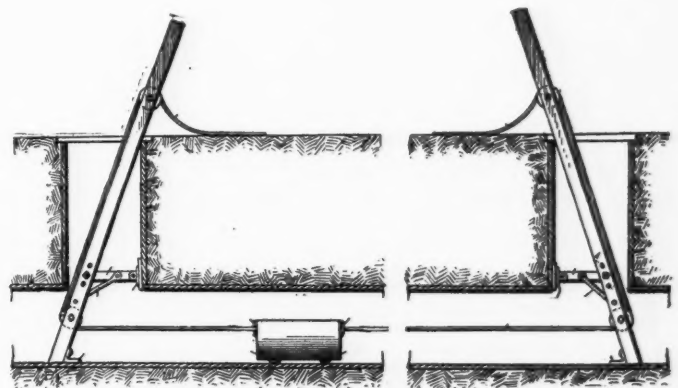
business portions of the city will be a thing of the past. Any of our readers who wish special information in regard to vitrified conduits of the above company, can learn all about them by applying to Mr. C. J. Harrington, 15 Cortlandt street, New York City, who is the general sales agent of this company.

A Unique Sewer Cleaner

It is a well known fact among scientific men everywhere that by far the greatest menace to human life arises from improper sewerage or the inadequate facilities for properly cleaning and maintaining an otherwise good sewerage system. Many millions of dollars are spent annually building and equipping sewerage in all parts of the United States and very few cities, though willing, have been able to cleanse properly. The United States Patent Office has issued a patent "device for cleaning sewers" to Michael T. Connolly of Jersey City, N. J., that promises to revolutionize the present system.

As seen by the illustration, this sewer cleaner consists of a steel bucket in the form of a half cylinder, to both ends of which is attached a strong wire rope. The ends of this bucket are closed by doors opening inward, so that when being drawn through the mud and water the forward door is forced open and the other shut, retaining the mud within the bucket. The ends of the bucket are fairly sharp and, to prevent catching on any small projections in a sewer, the bucket runs on two small rollers of about an inch radius set into the bottom of the bucket. Thus the sewers can be scraped to an inch of the bottom. The beams or supports shown in the cut as extending down the manholes, are of steel and hold the pulleys over which the wire rope runs and are firmly braced against the sides of the manholes. A team of horses is hitched to an end of the rope and the bucket is pulled through the sewer to one manhole when the mud in it is drawn to the surface in buckets. The operation is then reversed and the result taken up the other manhole. The bucket is thus worked back and forth, cutting through the mud until all is removed. The action is very rapid and, in an ordinary sewer, in which the filth has not accumulated too long, 500 to 600 feet can be cleaned in a day with the work of five men. When one section is clean, it is the work of but a few moments to shift one brace to the next manhole and continue operations.

The efficiency of the apparatus has been demonstrated in a forty-eight-foot intercepting sewer in Garfield avenue, Jersey City, N. J.,



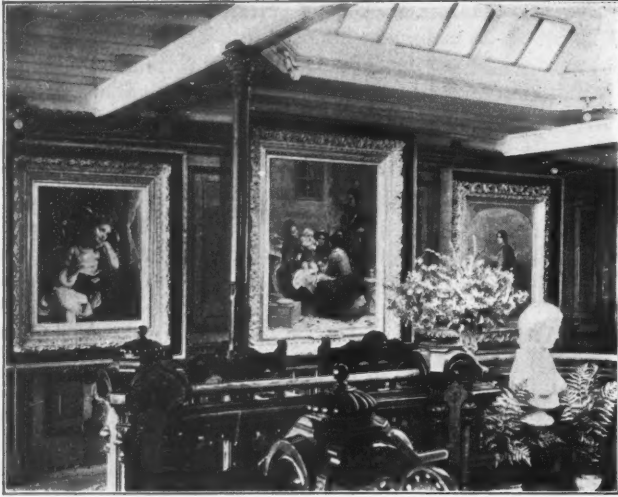
which had not been cleaned for over fifteen years and which was four-fifths full of compact filth. Even with such an accumulation, over 100 feet were cleaned in a day.

The device cleaned 12,000 feet of brick sewer under contract at Bayonne, N. J., the men working in four feet of water in a manhole. A test was also made at Hoboken by Commissioner Beyer.

This one is the first patent issued from the United States Patent office for a sewer cleaner in twenty-one years. Mr. Connolly has worked on the device for a period covering fifteen years. He was so jealous of his secret that no models were ever made and the engineer who drew the plans did so at Mr. Connolly's office, coming daily until completed.

The Hudson by Daylight

THE trip from New York to Albany on the Day Line steamers is one of the most delightful in the world. It affords a panoramic view of rocks, hills, mountains and valleys, unexcelled in their charming picturesqueness by any country in the world. It is 151 miles long. From the time you step on board the boat at New York, or Albany as the case may be, till the moment of disembarking, the journey is filled with unalloyed pleasure. The steamers are fitted



ART TREASURES ON THE ALBANY

with magnificent appointments, including some rare paintings and other things to rest the eye in the interior, when it grows weary of the changing scene outside. Every convenience which science and invention has been able to create, is placed at the disposal of the passengers. Their comfort is looked after with as great solicitude as if they were guests. The cuisine is noted and cannot fail to provide for every want of the most exacting. For time tables, directions, etc., address Mr. F. B. Hibbard, G. P. A., Hudson River Day Line, Desbrosses Street, New York City, N. Y.

Roller Lift Bridge Approved

FOR some weeks past there has been a warm discussion going on in Saginaw, Mich., relative to the proposed construction of a Scherzer Rolling Lift Bridge for Genesee Avenue. Considerable opposition was raised to the construction of this bridge, but after a most thorough investigation by the Federal Government it has been decided to construct the bridge as is indicated by the following message received from Washington by Major Baum from Congressman Fordney: "War Department approves bridge plans as recommended by the Detroit office. Official notice will be forwarded to you at once." Capt. Beach, of the Government Engineers' Office some time ago indorsed the plans for the construction of this bridge. It was done after a personal consultation with Mayor Baum and former City Engineer Terry. At that time Capt. Beach promised to forward the plans to Washington with his personal recommendation that they be approved. The outcome of this contest is satisfactory to the majority of the citizens of Saginaw. Business men in the city of Saginaw believe that the War Department's decision should put an end to the present controversy, and hope to have the bridge erected at the earliest possible date. The obstructionists should no longer stand in the way of this public improvement.

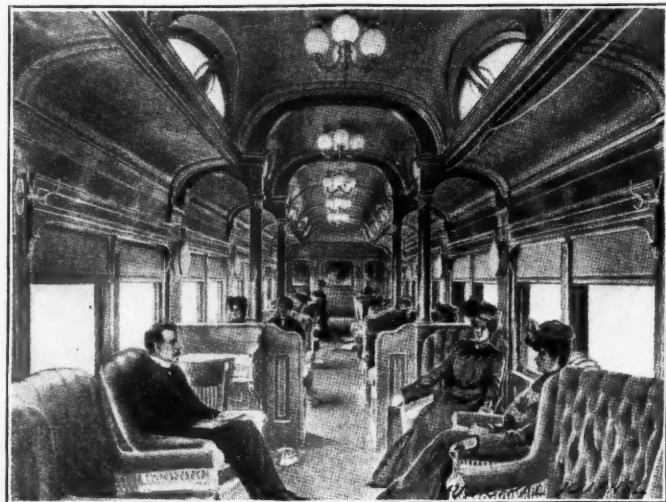
The city and officials of Saginaw should be heartily congratulated upon the outcome of this affair inasmuch as it has resulted in the selection of the bridge which is most likely to give satisfaction in future. It may be said that the Scherzer Rolling Lift Bridge represents the twentieth century, and the experience of the next decade will verify the judgment not only of the War Department but of those city officials who favored the construction of this modern type of bridge.

A Good Roads Railway

WHAT the Southern Pacific was to the great West, the Southern Railway has been to the South. Without the former the rapid development of that vast territory would have been delayed many years, and without the progressive spirit which animates the officials of the Southern Railway system, the South would develop much more slowly. The most recent evidence of the enterprise of this great railway system is that connected with the Good Roads Train which it fitted out and carried over thousands of miles of its railways at its own expense, with the co-operation of the National Good Roads Association and Director of Roads Inquiries Dodge. The good results from this trip have already commenced to be realized, and there is a strong demand from those sections which were not favored with a visit from the Good Roads train, and even more urgent demands from those sections which were visited by this "university on wheels," as Senator Daniel, of Virginia, called it. For full particulars of this road, the territory through which it runs, and the opportunities which are open to investors, address Mr. M. V. Richards, Southern Railway, Washington, D. C.

The Pere Marquette Railroad

WHEN the members of the League of American Municipalities wend their way towards Grand Rapids, in August, the seat of the next convention, and when they reach Detroit, if they consult their comfort, they will take the Pere Marquette Railway to Grand Rapids. Probably the most popular feature of the train service on this line is the parlor car service, which has made a name for the road throughout the country. The parlor cars are owned by the company, which permits of a low charge for service, and yet gives the passenger the best accommodations. The charge is only twenty-five cents from Detroit to Grand Rapids. The accompanying illustration shows the interior of one of the modern parlor cars in commission on this



A PARLOR CAR ON THE PERE MARQUETTE

road. It is fitted with every convenience and the comfort of the passenger is assured. A dining car is also attached to the train so that the traveler can take his meals en route. The service is *a la carte*. For particulars concerning train service address H. F. Moeller, G. P. A., Detroit, Mich.

The Lackawana Year Book

FOR many years it has been the custom of the D. L. & W. R. R. to issue a pamphlet containing a large amount of information relative to the mountain and lake resorts which may be found along its route. This year the book consists of 128 pages, handsomely bound in yellow, with an exquisite view, in colors, of the famous Delaware Water Gap upon the front cover. It contains a large amount of valuable information to those who are seeking hotels and boarding houses suitable for summer homes. There is also a series of stories by William B. Hunter relative to "The Experiences

of Pa," which are worth reading. The booklet is profusely illustrated.

It is always a pleasure to ride on the Lackawanna because the service is of the best. The conductors and brakemen are courteous and attentive. Besides it is one of the few roads that use hard coal.



A VIEW OF NEW YORK

It will be remembered that Mark Twain started on a journey to Chicago some years ago, in a white duck suit, over the Lackawanna road, and landed in Chicago with his suit still white. He gave the credit to the Lackawanna. At any rate it is a clean train service that you get on this road. Copy of the booklet, together with rate of fare to different points, and other useful information, can be had by addressing the General Passenger Agent, 26 Exchange Place, New York City, N. Y.

Elizabeth Puts in the Gamewell

For several years the city of Elizabeth, N. J., has used a makeshift for police purposes which consisted of a telephone system of its own device. At the time it was installed it was thought to be the best thing that was going and that the city would save money by using that instead of paying a fair price for a patented article. Not long after it was installed the department began to have trouble and to realize that it had made a mistake, but it took the city several years to wake up to the fact that even after installing a poor thing it would be wise to discard it and put in something worth while. Finally the city reached a place where it had to have a reliable system to be used in the police department, and just the other day awarded the Gamewell Fire Alarm Telephone Co., of 19 Barclay street, New York, a contract for the installation of one of the Gamewell Company's approved police signal telegraph systems. Former Director J. O. Brown, of the Department of Public Safety, in Pittsburgh, once said that the best apparatus which was manufactured for use in any department over which he had authority, no matter what it cost, was none too good to protect the lives of the citizens of Pittsburgh. Mr. Brown struck the key note in this statement, and city officials all over the country would act wisely to follow his example and invest their money in only the best that can be procured. It is the cheaper course in the long run.

Ball Bearing Axles

THE inventive genius of the Yankee is constantly adding to the number of appliances which tend to relieve the burden of the horse. There has been no improvement in vehicles in the last decade which has contributed so much to the comfort of the horse kingdom as the invention of roller bearing axles and rubber tires. These appliances are rapidly coming into use in all large cities and are highly appreciated by truckmen and firemen.

The ball bearing axle and Beasley elastic tire, manufactured by The Standard Anti-Friction Equipment Co., 50 Broadway, New York City, was recently put to a most severe test on sand wagon of the Knickerbocker Ice Co., of Chicago. These wagons, which were fitted with the product of this well-known company, are built to carry three cubic yards of sand, weighing 7,780 pounds. The weight of the wagon is 4,400, making an aggregate weight of 12,180 pounds, which is easily drawn by one team of horses.

One of the captains of the Chicago fire department had the hose wagon in his engine company fitted with the Empire ball bearing axles in December, 1900. In a recent letter to the manufacturer he

says: "So far, we have not had one moment's trouble of any kind with these ball bearings. We take the wheels off every sixty days and examine them, but have not greased them since first application. We have never seen any signs of water or dirt in them and are more than pleased with the wagon, and can say that we have as many runs as any company in the city, as we are centrally located. They are much easier to care for than the old style axle, as with the old style it was necessary to oil at least every week or ten days, where we find the ball bearings have run for seven months."

Fell 349 Feet and Still Lives

If the elevator in your building is fitted with the Ellithorp Safety Air Cushion Attachment you can fall 349 feet and live to tell the tale. The other day in the Frick Office Building, Pittsburgh, Pa., a test of the Ellithorp Safety Air Cushion was made. The car was taken up to the top of the shaft at the nineteenth floor and cut loose. There had been placed in the elevator several eggs, glasses of water and half a dozen live mice in a cage. Mr. H. C. Frick of Pittsburgh, Mr. D. H. Burnham of Chicago, several newspaper reporters and three hundred other individuals were called together to witness the test. At a given signal the man at the top of the shaft cut the rope which released the elevator car. The car descended like a flash of light. There were a series of swift, sharp, crackling sounds like



FRICK BUILDING, PITTSBURG, FITTED WITH ELEVATOR AIR CUSHIONS

the reports from a miniature battery, and then all was silent. Those present made an investigation and found everything as it had been left in the car; the water was spilled but the glasses were not broken; the mice were alive and were sold as trophies. But this was not surprising for Mr. Ellithorp has made the descent in a car in similar tests, about one hundred times, and expects to live to make the test a good many times more. Every elevator should be equipped with one of these air cushions and city officials should make it their business to agitate the subject in such a way that it will bring about the passage of an ordinance requiring all office buildings where elevators are in use, to have them equipped with this life-saving device. Some interesting information about this air cushion can be had for the asking by addressing the Ellithorp Safety Air Cushion Co., 31 Broadway, New York.

EXHIBITORS AT THE WATER WORKS CONVENTION

THERE was an unusually large attendance of members, guests and visitors at the Water Works Convention held at Chicago last month, and, as a natural consequence, the manufacturer was more in evidence than at any previous meeting. Among the exhibitors were the following:

J. B. Campbell Brass Works, Erie, Pa. Line of curb boxes, wrought iron pipe cutters, corporation and curb cocks. Mr. John A. Hennessey in charge.

Lamb & Ritchie, Cambridgeport, Mass. Showed sections, twisted pieces joints and fitting of fused lead and tin lined iron pipe from $\frac{1}{2}$ " to 2". Mr. Albert P. Briggs in charge.

Pittsburg Meter Co., Pittsburg, Pa. Showed full line of Keystone meters from $\frac{5}{8}$ " to 3". A sectional model of same and a fish trap; Mr. T. C. Clifford, Gen. Agt., was in charge assisted by Messrs. A. J. Pray, N. A. Holmes, T. C. Ripley and F. E. Taylor.

Neptune Meter Co., Jackson Ave., New York City.

Volkhardt Meter Box Co., New York City. Put up a sign, "Our exhibit lost on the road but we are here."

R. D. Wood & Co., 400 Chestnut Street, Philadelphia, Pa. Exhibited a display hydrant, Mathews fire type; Mr. Allen T. Prentice in charge.

Chicago Bridge & Iron Co., Chicago, Ill. Showed eight framed photographs of elevated water tanks built by them; Mr. E. G. Ladd and S. H. Hedges in charge.

H. Mueller Mfg. Co., Decatur, Ill. Had a fine large exhibit.

The Fisher Governor Co., Marshalltown, Iowa. Showed Fisher steam pump governor.

Lead Lined Iron Pipe Co., Wakefield, Mass. Showed lead and tin lined iron pipe fittings.

Pleuger & Henger Mfg. Co., St. Louis, Mo. Showed line of fire hydrants, valves and valve boxes; B. H. Sanders in charge.

Thomas Watkins, Johnstown, Pa. Exhibited Watkins pipe jointer and set of clamps; Thomas Watkins in charge.

Dearborn Drug & Chemical Works, Chicago, Ill. Samples of water showing impossibility of detecting impurities without analysis; samples of scale and boiler compound; R. T. Carr in charge assisted by G. W. Spear and A. Ruffner.

H. R. Worthington, 120 Liberty Street, New York City. Showed Worthington Water Meter; also glass and metal model to show working, etc.; Mr. Rufus S. Lytle in charge.

Thomson Meter Co., New York. Had an exhibit in room 132 of the Auditorium.

A. P. Smith Mfg. Co., Newark, N. J. Showed Rapp removable cast iron water pipe plug. A. P. Smith pat. tapping line for 2"-26" pipe. Shelly pat-tapper for $\frac{1}{2}$ "-2"; an independent fire line service hydrant. O'Neil pat. caulking machine for 24"-60" mains. Kerosene oil lead furnace. Sherrard & French valve inserting and pipe cutting machine; and a full line of brass corporation and curb cocks; D. F. O'Brien, Manager, in charge. A. P. Smith, J. W. Strachbein.

National Meter Co., 84-86 Chambers Street, New York City. Full line of Crown, Empire, Nash and Gem meters from $\frac{3}{8}$ " to 48"; Mr. F. J. Bradley, Western Manager, in charge assisted by George Irving, A. L. Holmes, N. J. Voss, S. Harrison, C. S. Francis, J. F. Forbes, W. G. Whyte and D. B. Leck; John Kelley, President, and J. C. Kelley, Jr., Sec'y, were also present.

Central Foundry Co., 116 Nassau Street, New York City.

Illinois Malleable Iron Co., 30 and 32 West Monroe Street, Chicago, Ill. Exhibited Chicago pat. meter box; Mr. J. R. Steneck in charge.

John A. Cole & Son, 1580 Old Colony Building, Chicago, Ill. Exhibited Cole-Flat pitometer; Mr. Edward S. Cole in charge assisted by T. C. Phillips.

NOTES ABOUT THE TRADE

—Mr. James H. Fuertes, C. E., of New York City, has been retained by the city of Harrisburg to prepare plans for an intercepting sewer in that city.

—Mr. William H. Gellately, formerly of the Standard Time Clock Co., has succeeded to the position of the late Mr. John N. Gamewell as Gen. Supt. of the Gamewell Fire Alarm Telegraph Co.

—The Rex Fire Extinguisher Company, 145 Center street, has received another order from the National Biscuit Company for 500 "Rex" Fire Extinguishers. They are now using 1,700 of these machines.

—The E. Keeler Co., of Williamsport, Pa., has issued a handsomely illustrated catalogue of thirty-six pages, with cover. Besides making a line of boilers it constructs self-supporting steel stacks and stand pipes for water works.

—Costello & Neagle, of Elmira, N. Y., are now engaged in laying two streets with their bituminous macadam at St. Mary's, Pa. About 8,000 square yards will be laid, which is in addition to the 7,000 square yards laid by them last year.

—The Associated Road Users of America, representing eight different organizations in and about New York, recently passed a resolution unqualifiedly indorsing the bituminous macadam water-proof pavement made by the Warren Brothers Company of Boston.

—The General Construction Co., 136 Liberty street, New York City, was recently incorporated to do general contracting business. Charles L. Parmelee and J. B. McCord are Secretary and Treasurer, respectively. They are young men, but have had large experience in the water works field.

—The Arnold Pump Valve, manufactured by the Power Specialty Company, 126 Liberty street, New York, said a prominent New York engineer the other day, "is the best in the market of its kind. It will not leak; it cannot press through seats, and it may be refaced without reducing strength."

—THE Christensen Engineering Company has just issued catalogue No. 51, containing a full description of motor driven air compressors, stationary and portable. It contains 24 pages and is handsomely gotten up, thoroughly illustrated, and can be had by addressing the company at Milwaukee, Wis.

—Warren Brothers Company, 93 Federal Street, Boston, Mass., have recently issued a large 28-page folder in black and white, handsomely gotten up and illustrated with views of their pavement in different New England cities, and of their plant. It also contains an indorsement of the pavement by the Road Drivers' Association of New York. This is one of the most valuable testimonials ever given of any pavement put on the market.

—THE Osborn Manufacturing Co., of Cleveland, O., has just issued a most attractive and useful catalogue of 148 pages, well illustrated and thoroughly indexed. This concern manufactures a most complete line of push brooms, including those made from steel wire, bass, split bamboo, rattan, both plain and with scraper, which are especially designed to meet the requirements of municipalities and street cleaning departments.

—The lakes and streams in the Adirondack Mountains are full of fish; the woods are inviting, the air is filled with health, and the nights are cool and restful. If you visit this region once, you will go there again. An answer to almost any question in regard to the Adirondacks will be found in No. 20 of the "Four-Track Series," "The Adirondacks and How to Reach Them," sent free on receipt of a 2-cent stamp, by George H. Daniels, General Passenger Agent, Grand Central Station, New York.

—The Toledo Asphalt Patcher Co., of Toledo, O., has recently issued a 16-page illustrated catalogue. It describes very thoroughly the asphalt paving plant which it has constructed for the use of cities and contractors. The machine has been invented by an expert in this line who has spent a life time with asphalt machinery, and should be appreciated by both contractors and municipalities. The

same plant is arranged for bituminous macadam. They are also constructed for sidewalks and cellar contractors. Further information may be secured by addressing the company.

—The Montauk Fire Detecting Wire Company, 100 Broadway, N. Y. City, reports that during the past month fire broke out in three places where its service is installed and the alarm immediately given. S. K. Lichtenstein, lawyer, 44 West 60th street, writes: "It is with satisfaction that I inform you that your system of automatic fire alarm installed at my residence gave practical proof of its efficiency showing the Montauk Detecting Wire operated at once." This company have issued a new pamphlet describing new combination of high and low fusing wire with much useful information.

LATEST NEWS FOR CONTRACTORS

Bids Wanted for Municipal Work—Franchises Granted—Contemplated Improvements—Contracts Awarded

PAVING

Newark, N. J.—The Street Committee of the Board of Works has recommended that Central Avenue be re-paved with granite block, and that block or asphalt be laid on South Sixth Street, and granite on Frederick, Bond and 12th Ave. City Engineer Van Keuren.

Washington, D. C.—The District Commissioners have asked the Senate District Committee to appropriate money for the paving of Wyoming Ave. This will cost about \$4,300.

Frederick, Md.—Property owners on East Church St. have asked that either vitrified brick or asphalt be laid as a sample to show the other citizens what benefits result from paving streets.

Jacksonville, Fla.—A petition signed by property owners asked the Board of Public Works to pave several streets.

Chester, Pa.—It is proposed to pave the roadway of Fifth street. H. H. Houston, Mayor.

Rensselaer, N. Y.—The Common Council has been considering the expenditure of \$30,000 for paving certain streets.

Helena, Mont.—Taxpayers have been trying for some time to have Main St. re-paved. Mayor Edwards.

Detroit, Mich.—The erection of a municipal asphalt plant has been urged by prominent persons, and it is probable that the same will be installed.

St. Paul, Minn.—The country roads of Ramsey County will be improved, and \$10,000 is to be expended for this purpose.

Canton, O.—The Council has been considering extensive street improvements and a number of resolutions have been introduced providing for the improvement of several streets. City Engineer Weber has brought in his estimate for the improvement of the East Second Street, and other estimates will be submitted as soon as possible.

Bridgeport, Conn.—The question of pavement for Stratford Avenue has been decided and the street will be paved with brick. The committee has not yet decided on the make. C. E. Williams, Director of Public Works.

Milwaukee, Wis.—After a visit to St. Paul and Minneapolis, City Engineer Poetsch of the Board of Public Works, will recommend that sandstone paving be laid on steep grades.

Toledo, O.—Resolutions have been passed for the paving of Clark and Federal Streets with paving brick or asphalt blocks laid on a six-inch concrete foundation. Charles H. Nauts, City Clerk.

Syracuse, N. Y.—City Engineer Schnauber and Mayor Kline have been considering the details of the plan for paving of North Franklin Street. It is probable that brick will be laid.

Des Moines, Iowa.—During the year eight streets have been marked for improvements, and three streets are to be sewered.

Boston, Mass.—The bill calling for a boulevard across Lyme Marsh which is to cost \$100,000 a mile has been reported adversely by the Committee on Ways and Means of the House; the said House has refused to accept the report.

Ocean City, N. J.—The citizens have voted to spend \$85,000 for street and other improvements.

Long Island City, N. Y.—Preparations are being made to re-pave and re-surface many of the highways of Queens County, and the Board of Estimate has appropriated \$56,000 for the work. Asphalt will be laid on the city streets and macadam in the outlying districts.

St. Joseph, Mo.—The Municipal Assembly has appointed a committee to confer with the property owners on Sixth Street and King Hill Avenue relative to the paving of these thoroughfares.

Springfield, O.—An ordinance has been passed to assess a special tax on real estate to pay for the expense of grading and macadamizing twenty-five streets and avenues.

Syracuse, N. Y.—Property owners on West Fayette, Butternut, Colvin, Oswego and Montgomery Streets are asking for the paving of these streets with either brick or asphalt.

—DURING the recent cyclonic disturbance in the vicinity of Winfield, Kans., one of the telephone poles belonging to the Winfield Telephone Co. was shattered by a bolt of lightning. This caused one of the wires of a toll line circuit to part and the two ends in falling happened to rest on moist earth. This moist earth completed the electrical circuit, and owing to the fact that the Winfield Exchange is equipped entirely with the Ericsson apparatus furnished by the Ericsson Telephone Co., New York City, the conversation was carried on the same as if the wires were whole. These telephones are extremely capable of carrying sound over long distances and under severe conditions, and it was probably owing to this fact that the break was unnoticed for several days.

New York, N. Y.—Commissioner of Public Works Redfield, of the Borough of Brooklyn, will receive bids on July 3d for some 110,000 square yards of asphalt paving.

Washington, D. C.—The property owners along Sixteenth Street ask that the same be graded and macadamized.

West Hoboken, N. J.—Ordinances have been introduced and passed for the pavement of Union and Dodd Streets with Belgian block. Considerable curbing will also be necessary. John P. McMahon, Town Clerk.

Bessemer, Ala.—Bids are wanted July 15th, for gravel sidewalks and curbs on several streets. There will be 13,320 lineal feet of 5-inch concrete curb, 2,150 cubic yards of chert and 3,400 cubic yards of earth works.

Freeport, Ill.—The aldermen have been considering a proposition of putting in a rock crushing plant.

Baltimore, Md.—Ordinances have been before the Council providing for \$30,000 worth of asphalt block on Twenty-second St. and a similar amount of the same paving on Charles St.

Schoharie, N. Y.—A recent vote resulted in favor of good roads. Atlantic City, N. J.—The Council has been considering a proposition for laying brick on Atlantic Ave., two-thirds of the cost of which is to be paid by the Pennsylvania R. R. Co.

Oneida, N. Y.—It has been voted by property owners to pave Main St. and Lenox Ave. at a cost of \$20,000.

Ishpeming, Mich.—It has been proposed that the city build 7,000 feet of concrete sidewalk. Supt. Dene, Board of Public Works.

Portsmouth, Va.—High and County Streets have been ordered paved by the Council. Bascom Sykes is engineer.

Cumberland, Md.—Bids will be received July 5th for the laying of brick of Decatur and Water Streets. In all 1,850 lineal feet. Brick will also be laid on Washington and Park Streets, a total length of 2,150 feet. D. P. LeFevre is the engineer.

Salem, Ind.—Bids are wanted July 7 for building the Salem and Sparks Ferry gravel road. George M. Scifres, County Auditor.

Decatur, Ind.—Bids will be received July 7 for an Indiana road grader. County Auditor Boch.

Scottsdale, Pa.—Bids are wanted July 7th for grading, paving and curbing on two streets. There will be 3,179 cubic yards of excavation, 3,720 lineal feet of curbing, 6,441 square yards of paving. I. D. Evans, Borough Engineer.

Warren, Pa.—Bids will be received July 14 for brick or block for paving Market St. Chairman Street Committee.

Redlands, Cal.—On July 2 \$50,000 street improvement bonds will be sold. City Clerk S. W. Clark.

Birmingham, Ala.—Ordinances have been passed calling for the macadamizing of several streets and for brick sidewalks and granite curbing on others. City Clerk J. C. Murray.

Elwood, Ind.—It has been reported on local authority that the Council will pave South Second St. with brick.

Anderson, Ind.—Bids are wanted July 27 for 1½ miles of macadam drives and 50,000 square feet of cement work. J. P. Seare, Sec'y, Directors, Maplewood Cemetery.

Ashland, Wis.—The Council is considering the purchase of a rock crusher. Address City Engineer N. T. Dozer.

Crookston, Miss.—It has been reported that the Council will order asphalt on ten blocks and macadam on fifteen blocks.

Indianapolis, Ind.—Resolutions have been adopted by the Board of Works for asphalt portions of East St. Clare and East Tenth Streets.

Manistee, Mich.—The Council has sold \$125,000 worth of paving bonds. Lancaster, O.—Bids will be received on July 1 for the purchase of \$120,000 worth of street improvement bonds. Clerk H. T. Mechling.

Milwaukee, Wis.—The Board of Public Works is considering a considerable amount of street work in the Eighteenth Ward. It is recommended that asphalt be laid on Lake St.

Binghamton, N. Y.—J. W. Howard, the Engineering Editor of *The Municipal Journal*, has been consulted by the authorities and estimates the cost of a municipal asphalt repair plant for the city at \$15,000.

Baltimore, Md.—Ordinances have been passed and signed for the paving of Rose, Henry and Cary Streets. City Engineer Fendall.

New Orleans, La.—The Council has disposed of \$100,000 worth of paving bonds.

Newburgh, N. Y.—Broadway will be paved with Telford macadam at a cost of \$45,000.

Clarksburg, W. Va.—The Council has appropriated \$12,000 for paving a part of Fourth St.

Dobbs Ferry, N. Y.—A resolution was adopted by the Board of Trustees for the purpose of having surveys and estimates made to determine the cost of paving several streets with block, brick or macadam.

Greensburg, Pa.—An ordinance has been passed by the Town Council favoring the issue of \$200,000 worth of street paving bonds.

SEWERS

Amesbury, Mass.—This town has voted against accepting permission to issue \$100,000 in bonds for sewers.

Stafford Springs, Conn.—Bids will be asked for 8 and 10-inch sewers in Maple, Cross, School and Edgewood streets as soon as the plans are ready.

Brockport, N. Y.—Bids for constructing the proposed sewers will be advertised at once. Village Clerk, A. C. McArthur.

Bronxville, N. Y.—Bids will soon be asked for a system of sewers. H. W. Leonard, Village President.

Watertown, N. Y.—City Engineer C. W. McComb states that the city will construct 6,000 feet of 12 and 18-inch sewers.

Spring Forge, Pa.—Bids will soon be called for a sewer system. W. B. Johnston, Chief Burgess.

Washington, Pa.—Bids are wanted July 7th for about 12,000 feet of main sewer to consist of over 11,000 feet of 20-inch tile sewer; 360 feet of cast iron sewer pipe, 18 manholes, etc. W. H. McEnrue, Clerk of the Council.

Morgantown, W. Va.—About \$15,000 will be expended for sewerage work. City Engineer R. T. Morris.

Winona, Miss.—Correspondence is solicited with firms dealing in sewerage and water works supplies.

Charlotte, Mich.—It is reported that a sewer system will be installed here.

Cedar Rapids, Iowa.—An extensive system of storm sewers is contemplated and a resolution of necessity has been introduced and notice given for its final consideration on the 28th day of July. Dimensions range from a six foot arch down to 18 inches in diameter. Final consideration of a resolution on laying 12 blocks of 8-inch sanitary sewer will be had on the 8th day of July. J. O. Jackson, City Clerk.

Cleveland, O.—Bids were asked the later part of June for \$988,000 worth of sewer district bonds.

Columbus, O.—The committee on sewers has recommended an ordinance providing for the sale of \$175,000 worth of bonds for constructing sewers.

Providence, R. I.—Resolutions were adopted by the Council for the construction of sewers in several streets.

Des Moines, Ia.—Construction Inspector Harris, as reported to the Council, recommends the installation of a system of storm water sewers.

Crookston, Minn.—The committee on sewers reported favorably upon the petition for about a mile of sewer construction.

West Hoboken, N. J.—Property owners in the southwest section recently held a meeting for the purpose of taking action on the question of a sewer outlet for that district. Engineer Mulbeck submitted plans for this sewer.

Fairview, N. J.—It is probable that a number of sewers will be constructed in this place.

Youngstown, O.—Ordinances have been passed for the construction of sewers in Foster and McKinnie Streets and Maple and Himrod Avenues. William I. Davies, City Clerk.

Harrison, N. J.—The Sewer Committee of the Council has voted to publish notices of intention for the building of the eastern district sewer. It is estimated that this sewer will cost \$53,000 and will run from Davis Ave. to the Passaic River.

Guttenburg, N.J.—The Town Council has provided for a committee to arrange the course and outlet for a new sewer system. Address Councilman Lutz for particulars.

York, Pa.—The question of sewerage for this place has been taken up by the city officials and both branches of the Council have decided not to delay the matter longer. As soon as the necessary funds can be secured the plans for the sewers will be made. Address Mayor Gibson.

New Orleans, La.—Sealed bids will be received until 12 M August 12th for the construction of ninety-eight miles of sewers, eight miles to be brick sewers, 72 to 27 inches in diameter, and ninety miles to be pipe sewers, 30 to 8 inches in diameter. There will be about 1150 manholes and 520 flush tanks. The work will be divided into three contracts and a \$15,000 certified cheque must be deposited with each bid. A bond for \$25,000 will be required of the successful bidder. Plans, etc. can be had from the Sewerage and Water Board. F. S. Shields, Secretary.

Windsor Locks, Conn.—On account of many complaints the health officer of the county has investigated the sewer problem, and the only solution in the opinion of many is the construction of a modern system. Health Officer Coogan.

Brockport, N. Y.—At an election held in this village recently a propo-

sition for adequate sewage disposal was carried by a majority of 127. John W. Cunningham, President.

Columbus, O.—City Engineer Griggs recently reported to the Council Committee on Sewers that \$1,000,000 would be necessary to complete the sewerage system and put it in first-class condition. As the city finances will not allow such an expenditure at once, Engineer Griggs suggests that extensions be made from year to year, and that at present \$175,000 in bonds be issued. This will pay for the laying of eleven miles of main trunk sewers.

San Francisco, Cal.—City Engineer Grunsky has recommended that \$500,000 be expended for improving the sewer system.

Madison, N. J.—Plans have been submitted to the State Sewage Commission by Wise & Watson for a system of sewers for this place.

Millville, N. J.—The State Sewage Commission has received plans from W. H. Boardman, Philadelphia, for sewers for this place.

Holly, Mich.—Surveys were completed to show that the sewer system proposed will cost at least \$16,000.

Cleveland, O.—New bids are wanted July 10 for a main intercepting sewer in Lake Street. Charles P. Salem, Director of Public Works. Bids are also wanted July 15 for an intercepting sewer in the tunnel.

Green Bay, Wis.—The issue of \$10,000 worth of sewer bonds has been authorized by the Council.

Duquesne, Pa.—July 15 bids will be received for \$20,000 worth of sewer bonds by George W. Richards, Chairman of Finance Committee.

Wilmington, Minn.—Bids will be received July 1, for \$3,000 sewer bonds. S. I. Long, Village Recorder.

New York, N. Y.—President Haffen of the Bronx has been awarded \$32,000 for the purpose of cleaning and re-building sewers.

Melrose, Mass.—Bonds have been authorized in the sum of \$100,000 by the Legislature for the purpose of building the proposed system of drainage.

Ligonier, Pa.—It is proposed to construct a sewerage system to cost \$7,000 and the Council is having a map prepared. J. J. Janeway, Engineer.

Zion City, Ill.—The 4,000 foot eight or ten-inch sewer will be constructed soon. B. J. Ashley, Chief Engineer.

McKeesport, Pa.—It has been recommended by the Finance Committee that a special election be held to vote on \$75,000 worth of bonds for building the Crooked Run sewer.

Denver, Col.—Plans for the construction of a sanitary sewer, District No. 6, are in the hands of Public Works.

Johnstown, N. Y.—The Board of Trade has under consideration plans for a \$50,000 sewer system.

Warsaw, N. Y.—The survey for the proposed sewer system made by W. J. White of Buffalo, has been completed.

Colorado Springs, Col.—It has been reported that a three-mile drainage tunnel has been suggested by the El Paso Consolidated Co. The cost is estimated at \$350,000.

Warrensburg, N. Y.—The State Board of Health has approved the plans for the proposed sewer system to cost \$3,500.

WATER WORKS

Troy, N. Y.—The bids received by the Board of Contract and Supply for the construction of the Tomhammock branch of the water works, were as follows:

Michael McDonough,	\$269,625.00
Kirk, Norwood & Co., Albany,	371,311.00
Jehil Vaughn, Stamford, N. Y.,	270,074.80
P. H. Harrison & Son Co.,	397,880.00
J. Durfee & Co.	365,936.80

For portions of the work bids were received for the dump and spillway:

J. Durfee & Co.,	\$197,174.00
P. H. Harrison & Son Co.,	210,081.51
Jehil Vaughn,	159,111.00
Kirk, Norwood & Co.,	189,828.00
Michael McDonough,	178,388.00

Contracts were awarded to Michael McDonough and P. H. Harrison & Son Co.

Charleston, S. C.—The city has entered into a contract with the Mercantile Trust and Deposit Co. of Baltimore for an exclusive franchise for thirty years, for the construction and operation of water works. Charleston is to get 300,000 gallons of water daily at a charge not exceeding \$44,000 a year. The Charleston Light and Water Co. is the corporation to carry out the project for the trust company, and has acquired the present water works. Until the completion of the new plant the city will pay the company \$25,000 a year for the municipal supply. \$1,500,000 in bonds and \$1,000,000 in stock will be issued to cover the cost of the new work. The plant is to have a capacity of 5,000,000 gallons daily, is to be filtered and brought through 24-inch mains.

Pittsburgh, Pa.—The Pennsylvania Water Co. has been reorganized, and \$1,000,000 will be at once expended for improvements. James H. Harlow is the President and one of the Directors. New pumps, new reservoir and filters are to be installed. The latter will be of the mechanical type.

Sacramento, Cal.—The discussion over an auxiliary pump for the water works has been continued, and the questions now are whether it shall be a centrifugal pump and what motive power shall be used. J. C. Pierson, City Surveyor.

Baltimore, Md.—City Engineer Quick has requested that an election be held to vote on \$1,000,000 loan for the purpose of increasing the capacity of the plant and extending the service. He states also that a new reservoir within the city limits is needed for the purpose of providing clear water storage for the spring months.